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Rethinking Abstractionism: Aquinas's Intellectual Light and Some Arabic Sources

THERESE SCARPELLI CORY*

ABSTRACT The thesis of this paper is that Thomas Aquinas offers an alternative model of abstraction (the Active Principle Model) that overcomes the standard objections to abstractionism and expands our view of what an abstractionist theory might look like. I contend that this alternative model of abstraction has been invisible in plain sight, in Aquinas's references to the mind's abstractive mechanism as an "intellectual light." Such language is not metaphorical but rather technical, signaling that intellectual abstraction is to be modeled on the activity of physical light as he understood it from theories proposed by Avicenna and Averroes. The Active Principle Model requires us to rethink Aquinas's account of how we come to know essences—a process that turns out to be much more tentative and incremental than previously thought.

KEYWORDS abstraction, abstractionism, intellect, Thomas Aquinas, Averroes, Avicenna, light, illumination, empiricism

THE EXISTENCE OF UNIVERSAL CONCEPTS or concepts of essences is difficult for an empiricist to explain.[1] If all our concepts are supposed to derive from sensory experience, but I only experience this or that particular horse, how do I end up with the universal concept 'horse'? Or how do I acquire a concept of an essence, if my senses only access accidents? One way of handling such problems is to posit a mental act of abstraction, typically associated with a selective consideration, as

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in Geach's standard definition: "'Abstractionism' is a name for the doctrine that a concept is acquired by a process of singling out in attention some one feature given in direct experience—*abstracting* it—and ignoring the other features simultaneously given—*abstracting from* them."[2] On this account, Napoleon acquires a concept of "horse" by selecting from his sensory experience of his horse Marengo only those features that are common to horses (ability to neigh, having a mane and four legs, etc.). But the standard objections to this account, which I will discuss in a moment, are so serious that abstraction has largely been abandoned as a strategy for defending empiricism.[3]

This paper proposes to revisit abstractionism through the work of the medieval thinker Thomas Aquinas. My thesis is that Aquinas offers an alternative model of abstraction that overcomes the standard objections and promisingly expands our view of what an abstractionist empiricism might look like. Many contemporary interpreters of Aquinas—including even Norman Kretzmann, Eleonore Stump, and Anthony Kenny—have failed to notice this alternative model, reading him instead as a proponent of some form of the standard account of abstractionism. I contend that this alternative model has been invisible in plain sight, in Aquinas's references to the mind's abstractive mechanism as an "intellectual light." While contemporary interpreters have assumed the language of light to be merely metaphorical,[4] I contend that Aquinas means it in a technical sense, so as to model intellectual abstraction on the activity of physical light as he understood it. So we will need to investigate what theories of physical light were circulating at the time, an inquiry that takes us back to Aquinas's major Islamic sources on this theme, Avicenna and Averroes. I hope to show that in Aquinas, the mind's innate abstractive mechanism accounts for intellectual concepts as *having a certain mode of existing and representing*, but it does not determine the *content* of those concepts. In fact, contrary to what is often assumed,[5] Aquinas designates no psychological mechanism as the guarantor for the accuracy or completeness of our concepts.

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[2]Geach, *Mental Acts*, 18.

[3]Geach pronounced abstractionism dead in 1957 (*Mental Acts*, 18–38), and abstraction tends no longer to be treated as a viable option in discussions of empiricism; see e.g. Markie, "Rationalism v. Empiricism."

[4]The only exceptions I can find are González-Ayesta, "El intelecto agente en Santo Tomás: *lumen* y hábito," 1410–11; Guillet, "La 'lumière intellectuelle' d'après S. Thomas," 82; and to some extent Corrigan, "Light and Metaphor in Plotinus and St. Thomas Aquinas," 197–99. The neglect is perhaps partly fueled by Aquinas's statement in *Sent.* II.13.1.2 [Mandonnet 2:330]: *[C]um lux sit qualitas per se visibilis, et species quaedam determinata in sensibilibus; non potest dici in spiritualibus nisi vel aequivoce vel metaphorice*; nevertheless the same text goes on to argue that there is a real analogy in the sense of a "likeness of proportionality" between physical and intellectual light as the principles of manifestation in their respective spheres.

[5]Even by Geach, who otherwise recognizes that Aquinas does not adhere to the standard account of abstractionism (*Mental Acts*, 130–31). An interesting discussion of the mind's reliability in Aquinas appears in MacDonald (*Knowledge and the Transcendent*, 115–23), which nevertheless places too much weight on the intellectual light. Certainly *having* an intellectual light is for Aquinas essential to the intellect's reliability, in the sense that it is essential to being intellectual in the first place. But the *activity* of this light in abstraction is not intended to "ground the reliability of intellective abstraction," as MacDonald (*Knowledge and the Transcendent*, 122) suggests, and as in fact Pasnau likewise believes (*Aquinas on Human Nature*, 318).

The first section of the paper introduces and critiques the two models of abstraction typically applied to Aquinas, which derive from the standard view of abstractionism as described above (I call them the "Unwrapper Model" and the "X-Ray Model"). The second section identifies an alternative model in Avicenna's and Averroes's theories of physical light (I will call this the "Active Principle Model"). The third section applies this model to Aquinas's account of abstraction. The last section explores some philosophical implications of the Active Principle Model, showing, among other things, that it is not vulnerable to the standard critiques of abstractionist theories.

I. THE UNWRAPPER AND X-RAY MODELS OF ABSTRACTION

Aquinas develops his abstraction theory in order to reconcile five core premises of his philosophical psychology:

(1) All our knowledge originates from sensation.
(2) In order for a cognitive power (sense, imagination, or intellect) to cognize some object, it must be assimilated to that object. That is to say, the cognitive power must acquire a form that is a likeness or representation of the object, making the power be "like" that object.
(3) In order to inhere in a cognitive power, a form must have the same mode of existing as the cognitive power (i.e. material or immaterial).
(4) The senses and imagination are material cognitive powers.
(5) The human intellect is an immaterial cognitive power.[6] (For the present purposes, all we need to know about immateriality in Aquinas is that it is a mode of existing different from the temporally- and spatially-extended material mode of existing.)

On their face, these five premises lead straight to a compatibility problem. On the one hand, sense and imagination cognize in virtue of forms that have a material mode of existence. For example, suppose I encounter Napoleon's battle-steed, Marengo. For Aquinas, the raw sensory input (color, smell, texture, etc.) is received in the external senses, bundled by the common sense, and then organized into a "phantasm," that is, a form in the imagination that is the likeness of "this individual horse Marengo." Like the sense-data from which they are compiled, phantasms have a material mode of existing, informing the neurophysical power of imagination whose organ is a part of the brain. Yet on the other hand, in order for me to cognize Marengo's essence, "horse," my immaterial intellect must receive an immaterial likeness of "horse," which Aquinas calls a *species intelligibilis* or "intelligible species." And per (1), all our knowledge about the essence "horse" must originate in neurophysical processes beginning in sensation. So how is

[6]Aquinas's arguments for the immateriality of the intellect have received considerable scholarly attention, but we need not examine them for the present purposes. For an example of the disagreement, see the debate between Gyula Klima and Robert Pasnau in Klima and Hall, eds., *Immateriality of the Human Mind*, 25–44.

information conveyed from the material, sensory experience of Napoleon's horse Marengo, to the immaterial intellect?

Enter the "agent intellect" or "intellectual light," which abstracts the immaterial intelligible species, "horse," from the material phantasm, "Marengo" (see Fig. 1).[7] The abstracted species becomes the form of the "possible intellect," enabling me to cognize the essence, "horse." Intellectual cognition is thus the result of the joint activities of the agent intellect's abstracting, and the possible intellect's receiving, an intelligible species. (About the role of species in cognition: It is important to note that as the intramental likeness of an extramental thing, the species is not in ordinary cases the object of cognition, "*id quod cognoscitur*," but rather the means of cognition, "*id quo cognoscitur*," insofar as it assimilates the intellect to the extramental thing, an assimilation that is necessary for cognition.[8])

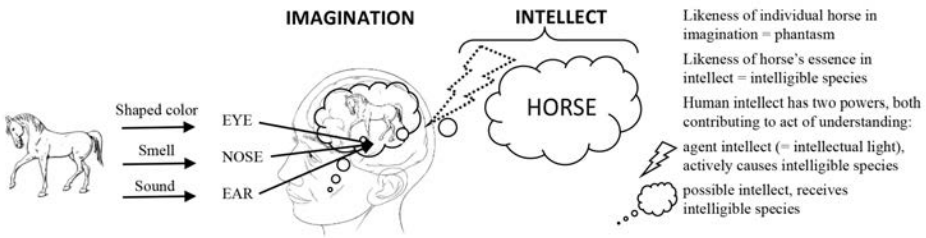

Figure 1. **Aquinas's Philosophical Psychology** (this simplified structure omits the contribution of some inner senses—common sense, estimation, and memory—in order to focus on the elements relevant to this analysis)

Now it is all very well to say that the "light of the agent intellect" intervenes at the critical juncture to achieve the jump from material to immaterial being. But how does Aquinas think this abstraction works? In attempting to answer this question, his readers tend to rely on one of the two following models, which are based on the standard account of abstractionism described above.

The first is a selective consideration model, which I call the "X-Ray Model." According to this model, the phantasm "Marengo" includes two types of content: essential features shared with other horses (e.g. four legs, ability to neigh, mammality, etc.) and individual Marengo-specific features (e.g. individuated in this chunk of matter, grey, fearless in battle, etc.). Abstraction consists in bracketing the Marengo-specific content so as to isolate the essential content, as an X-ray that

[7] *Sent.* I.34.3.1, ad 1 offers a good summary [Mandonnet 1.798]: *[I]n cognitione intellectualium est duo considerare; scilicet principium speculationis, et terminum. Principium quidem est ex sensibilibus; sed terminus est in intelligibilibus, secundum quod in cognitione naturali ex speciebus a sensu acceptis intentiones universales accipimus per lumen intellectus agentis.* Aquinas refers to the agent intellect as a light in at least 94 texts, with the earliest in *Sent.* I.3.4.5 [Mandonnet 1.122] (c. 1252–56); and the latest in *In Ethic.* 6.5 [Leon. 47/2.349:52–53] or *De malo* 16.12, e.g. ad 3 [Leon. 23.334:224–31] (dated 1271–72 and 1272, respectively; for dating of these works, see Torrell, *Saint Thomas Aquinas* 1:332, 336, 343).

[8] See for instance *Sum. theol.* Ia.85.2 [Leon. 5:333–34].

reveals bones apart from soft tissues, enabling a doctor to examine the previously invisible skeletal structure. Thus Pasnau holds that "abstraction is simply a process of selective attention, whereby the agent intellect focuses on one thing (the form alone) and brackets off the rest (the particular material conditions)."[9] Similarly, Kenny characterizes Aquinas's agent intellect as an ability to set aside irrelevant sensory data, comparing it to Chomsky's "innate language-learning capacity."[10]

The second model is what I call the "Unwrapper Model." According to this model, the imagination "delivers" a phantasm to the intellect (the image of the particular horse Marengo), from which the agent intellect extracts the intelligible essence "horse" by stripping or peeling away everything in the phantasm that blocks cognition—the material, particular "packaging." (Proponents tend to leave vague whether this packaging is *part of the content* of the phantasm, or belongs to the metaphysical properties of the phantasm itself.) Once all the material particularity has been stripped away, the universal, immaterial core within can be received into the possible intellect as the intelligible species. This model appears, for instance, in Kretzmann, when he attributes to Aquinas the view that abstraction "remove[s] the nature from the particularizing circumstances that still accompany it in the phantasm," allowing the nature to exist in the intellect in a "stripped-down condition."[11]

The difference between the Unwrapper and the X-Ray Models is that the latter conceives abstraction in more psychological terms as a selective consideration, whereas the former conceives it in more metaphysical terms as the stripping-away of certain properties. At root, however, they share the same notion of abstraction as a content-sorting that isolates universal and essential features. Thus Stump, for instance, juxtaposes the language of both models when she writes that "the process of abstraction is a matter of removing or ignoring the many material accidents of a thing as preserved in the phantasm and focusing instead just on the thing's quiddity. . . . In abstracting the intelligible species from the phantasm, then, the

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[9]Pasnau, "Abstract Truth in Thomas Aquinas," 44 (but cf. the Unwrapper Model language in Pasnau's earlier *Aquinas on Human Nature*, cited in n. 11). Likewise, MacDonald, *Knowledge and the Transcendent*, 119 and 123; Brower and Brower-Toland, "Aquinas on Mental Representation," 213–14; Bobik and Sayre, "Pattern Recognition," 36–37; Peifer, *The Concept in Thomism*, 120; and the works by Lonergan and Mayer, cited in n. 99.

[10]Kenny, *Aquinas on Mind*, 47. In my view, the comparison to Chomsky is problematic, inasmuch as it seems to collapse the distinction between agent and possible intellects in Aquinas; for critique, see Ross, Review of Kenny, *Aquinas on Mind*, 534–37. Later in the same work (102–3), Kenny denies that Aquinas's account conforms to the standard selective-attention account of abstraction that Berkeley and Wittgenstein ridicule, inasmuch as it does not satisfy what Kenny takes to be the two basic tenets of a selective-attention account: (a) the identification of thought with mental picturing; (b) numerical identity of the idea of the universal and the sensory representation.

[11]See for instance Kretzmann, "Philosophy of Mind," 142; Pasnau, *Aquinas on Human Nature*, 300–301: "[Common natures] exist in reality, accessible through a process of stripping away the object's contingent, accidental features. Beneath the accidents lies a common kernel, the quiddity of the object, qualitatively the same from object to object even if it is not numerically the same"; King, "Two Conceptions of Experience," 10–11; Stump (n. 12 below); and Simon (n. 13 below). Similar formulations are also common in older studies; see for instance Cunningham, "A Theory on Abstraction in St. Thomas," 252; Simmons, "In Defense of Total and Formal Abstraction," 431, for whom "an intelligible nature [is] freed by abstraction from the matter which adds nothing to it, and, in fact shrouds its intelligibility"; and Brennan's textbook, *Thomistic Psychology*, 180.

agent intellect strips the phantasm of the particular material characteristics of the thing whose similitude the phantasm is."[12]

The appeal of construing abstraction in one of these two ways as a kind of "sorting" is that this approach bolsters confidence in the mind's access to essences. If "horse" is communicated from Marengo to the mind via sensory experience, then the agent intellect need only extract it from the material packaging, and we need not worry about whether the world as we know it "fits" with the world as it really is.[13]

Nevertheless, this general approach to abstraction, as expressed in the Unwrapper and X-Ray models, faces three standard objections. First, there is the transmission problem that Geach took to be fatal to abstractionism.[14] The senses do not grasp essences, so "horseness" cannot be part of the content of the phantasm "Marengo." So how can the agent intellect extract or isolate "horseness" in the phantasm?[15] A related concern was raised by the late thirteenth-century Franciscan John Duns Scotus, who argued that sensory experiences only display a thing's accidents and do not carry a nugget of substantial being or quiddity that could be extracted by the agent intellect.[16]

Second, even supposing one solves the first problem, a criteriological problem emerges: How does the agent intellect "know" which features to select from the phantasm of Marengo, so as to produce the same universal "horse" in every mind?[17] If it has no selection criterion, then it cannot distinguish the essential from the inessential. But if it *does* have a criterion, it must already know the essence, and abstraction is unnecessary.

Third, although Aquinas introduces abstraction to overcome an interaction problem, the mechanism of abstraction itself seems liable to the same problem: How can the immaterial agent intellect act on the material phantasm, if they occupy different metaphysical spheres? Or to use the language of light: How does an immaterial intellectual light "shine on" a material phantasm?[18]

These are serious problems, and the mysterious language of "intellectual light" only exacerbates the impression that, as Pasnau puts it, "[Aquinas's] account of the agent intellect seems to appeal to nothing more than a kind of magic."[19]

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[12]Stump, *Aquinas*, 264–65.

[13]See for instance Simon, *Metaphysics of Knowledge*, 120–21: "The production of the idea is an *abstraction* that disengages the intelligible from the image. By a unique act, the mind causes the intelligible to emerge from the image that contains it—the intelligible is there because nature is an idea of the divine art."

[14]Geach, *Mental Acts*, 20 and 33–44.

[15]As Pasnau puts it, "How do the senses, given their materiality, represent 'the nature of the species' in such a way that this information can be lifted out by a simple process of selective attention?" (*Aquinas on Human Nature*, 317); see also Mayer, "Apriori or Aporia?" 714.

[16]Scotus famously argues (here in support of a univocal concept of being) that if substance directly moved our intellect, we would be able to recognize after the consecration of the Eucharist that the substance of bread is no longer there (*Opus oxoniense* I.3.3, in Wolter, 5–6). For discussion, see Bazán, "Conceptions of the Agent Intellect and the Limits of Metaphysics."

[17]See again Pasnau, *Aquinas on Human Nature*, 317.

[18]For discussion of this problem, see Day, *Intuitive Cognition*, 12.

[19]Pasnau, *Aquinas on Human Nature*, 318.

Nonetheless, I contend that Aquinas cannot have held that the agent intellect's function is to isolate an essential "core" in the phantasm (as assumed by the above two models), because in fact he agrees with the first standard objection to abstractionism above: Intelligible, universal "horse" is not part of the phantasm "Marengo" in the way that a brick is part of a house. Instead, the phantasm and the intelligible species are related as the *potentially intelligible* and the *actually intelligible*. The phantasm (not to mention Marengo himself) is potentially intelligible and individual through-and-through,[20] whereas actually intelligible, universal horseness exists only in the intellect.[21] For Aquinas, then, the relationship between the material, intelligible universal and the extramental object of cognition has to do with the relationship between *two modes of existing*, not the relationship of a part to the whole from which it is taken.[22]

Within this framework, as O'Callaghan has argued, intellectual abstraction calls for *a mechanism that makes the potential actual*, rather than a sorting mechanism.[23] I propose, then, that Aquinas's abstraction theory deploys a third type of model, according to which abstraction is less like a subtraction, and more like a metaphysical "addition" (to speak metaphorically), in the sense of an actualization, the metaphysical "gain" of a new formality or actuality. This model is borrowed from natural philosophy and metaphysics, where it applies to cases such as illuminating and heating. We can call it the "Active Principle Model" (APM).

Broadly speaking, an "active principle" is a form that is capable of inducing the same form in other things. APM thus describes causal interactions in which an active principle induces the same form in some recipient—or, speaking more precisely, causal interactions in which an agent acting in virtue of that active principle, induces the same form in some recipient. Heating provides a paradigm case: when I open the window in a warm kitchen on a cold day, heat rushes immediately from the already-actually-hot air inside into the heat-deprived air outside. As this case shows, in order for an active principle to act, it is sufficient that the active

[20]See Lisska, "Deely and Geach on Abstractionism in Thomistic Epistemology," 565–66. For Aquinas, even the principle of individuation, "signate matter," is intelligible (though it cannot be understood by abstraction). Thus God cognizes it by causing it; see *Sum. theol.* Ia.14.11, ad 1 [Leon. 4.183–84].

[21]For just one example, see *Quaest. disp. de an.* 4 [Leon. 24/1.33:99–107]: *[N]ecesse est quod intelligibilia moueant intellectum possibilem. Quod autem non est non potest aliquid mouere. Intelligibile autem per intellectum possibilem non est aliquid in rerum natura existens ut intelligibile est. Intelligit enim intellectus possibilis noster aliquid quasi unum in multis et de multis. Tale autem non inuenitur in rerum natura subsistens.* This is not to deny Aquinas's realism about essences; he holds that Marengo and other horses really do share a common nature, although this nature exists extramentally only as instantiated as individual horses (hence the famous statement from *De ente et essentia* 2 [Leon. 43.374:80–82]: *[I]n Sorte non inuenitur communitas aliqua, sed quicquid est in eo est individuatum*). Whether this position is in fact consistent with realism about essences, is not within the scope of this paper.

[22]See Owens, "Thomistic Common Nature and Platonic Ideas," 212.

[23]See O'Callaghan, *Thomist Realism*, 218–21, arguing that Aquinas's agent intellect is no extractor or slide-projector, although he takes the "light" language as metaphorical. Smit ("Aquinas's Abstractionism") recognizes the agent intellect's "actualizing" role, but I cannot agree with his conclusion that it actualizes by adding *content* from innate concepts of being and unity, contrary to Aquinas's insistence that the concept of being itself is derived by abstraction from phantasms; see also Hankey, "*Participatio divini luminis.*" Others who recognize the agent intellect's actualizing role are Spruit, *Species intelligibilis,* 1:168; Andrés, "Entendimiento agente"; Cromp, "L'abstraction de l'intellect agent," 4:142; and Rabeau, *Species, Verbum*, 28–31.

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principle and a recipient with a disposition for the relevant form be "together" in the relevant way.[24] (It should be noted that although we will speak loosely, as Aquinas often does, about the *form* as making other things like itself, nevertheless when speaking precisely he insists that it is always the individual substance that is exercising causal powers. So for instance although we might say loosely that heat has the power to heat other things, it would be more precise to say that in virtue of heat, fire or some other hot thing has the power to heat other things.[25])

Significantly, the most widely accepted philosophical accounts of physical light in the thirteenth century were modeled on APM. The fact that Aquinas explicitly invokes the behavior of physical light as an analogy for abstraction, then, should be enough to warrant further investigation. The place to search is in the two major Islamic sources for mid-thirteenth-century Latin thought on physical and intellectual light: namely, the Persian philosopher Ibn Sīnā, known in Latin as Avicenna (980–1037), and the Aristotelian commentator from Cordoba, Ibn Rushd, known in Latin as Averroes (1126–1198). They are the proximate sources for what Aquinas and his contemporaries took as the two major competing models of physical light—both of which adopt some version of APM. We will sketch each model only to show how APM is applied in each case, noting that a great deal more could be said about physical light and its relationship to intellectual light in these fascinating thinkers.[26]

2. THE ACTIVE PRINCIPLE MODEL IN AVICENNA AND AVERROES

On one construal, well-known to scholastic authors, light is a certain kind of form or act that facilitates vision by inhering in the *object of vision*, constituting that object itself as an active principle of vision (we can call this APM_1). APM_1 is exemplified in Avicenna's account of physical light as the sheer form of visibility, which, when it inheres in potentially colored objects, formally constitutes them qua visible.[27] For Avicenna, a body apart from light—such as a green jar in a darkened room—is only potentially colored: "If light does not illuminate, [the body] is black

[24] *Quodl.* 8.2.1 [Leon. 25.56:34–40]: *[A]nima humana similitudines rerum, quibus cognoscit, a rebus accipit illo modo accipiendi quo patiens accipit ab agente. Quod non est ita intelligendum quasi agens influat in patiens eandem numero speciem quam habet in ipso, set generat sui similem, educendo de potentia in actum.* His examples of sufficient active principles are fire and illuminated color (44–53, 63–69).

[25] See *Sum. theol.* IIa-IIae.58.2 [Leon. 9.10]: *Actiones autem sunt suppositorum et totorum, non autem, proprie loquendo, partium et formarum, seu potentiarum, non enim proprie dicitur quod manus percutiat, sed homo per manum; neque proprie dicitur quod calor calefaciat, sed ignis per calorem*; and *Sent.* III.18.1.1, ad 2 [Moos 3.556]. I am grateful to JT Paasch for his insights on this issue.

[26] I present Avicenna's and Averroes's views here as they were communicated to Latin-speaking Scholasticism in their Latin translation, i.e. as the views of "Avicenna Latinus" and "Averroes Latinus." For the reception of these light-theories in Aquinas's contemporary Roger Bacon, see Tachau, *Vision and Certitude*, 3–26.

[27] Avicenna, *Liber de anima* 3.1 [Van Riet 1:175]: *Lumen enim visibile est, et id in quo est lumen est visibile.* For Avicenna on physical light, see Gätje, "Zur Farbenlehre in der muslimischen Philosophie"; Lindberg, *Theories of Vision from Al-Kindi to Kepler*, 43–52; Hasse, *Avicenna's* De anima *in the Latin West*, 107–27, addressing also the Latin medieval reception of this doctrine; and McGinnis, "New Light on Avicenna."

only in the sense of being dark, and it is potentially colored."[28] When I open the window-blinds, the sunlight enters into formal composition with the jar's potential greenness, "mixing" with it so that the jar becomes actually green:

> Light is part of the composition [*pars compositionis*] of this visible thing that we call color, and it is such that when it is admixed with potential color, actual color comes forth from both on account of their ability to intermingle. But if there is not such an aptitude [for color—namely, if the receiver of light is translucent], it will be light and splendor by itself alone; for light is, as it were, a part of that which is color and a mixing of it. (*Liber de anima* 3.3; Van Riet 1:192)

Avicenna is careful to clarify that although light informs and actualizes potential color, *light itself is not a determinate color-form or even the sum of all colors.*[29] Rather, as the sheer form of visibility, light *causes* actual color in the objects it informs. (To put it another way: The form of visibility plus the disposition for greenness are each necessary and jointly sufficient for the existence of actual greenness.[30]) Moreover, in becoming actually green by illumination, the jar becomes an active principle of color, instantly communicating its colored likeness to any properly-disposed receivers to which it is conjoined—for example, to the human eye through the medium of air.[31] In other words, actual color naturally self-displays, and this property of being "self-displaying" is just what it means to say that the green jar is visible. (Incidentally, that is why color must be actualized by light: if self-displaying is the same as visibility, and actual color is self-displaying, then visibility is the necessary condition for *being actually colored.*) "[The object] needs to be illuminated by acquired light *so that it may appear* [*ut appareat*]."[32]

The role of physical light in illumination, as modeled by APM_1, then, can be summarized as follows (see Fig. 2): physical light in itself is the indeterminate form and active principle of visibility, which formally inheres in potentially colored objects, constituting them qua visible objects, and thus exciting in them "the being [*esse*] of some property," namely actual color.[33]

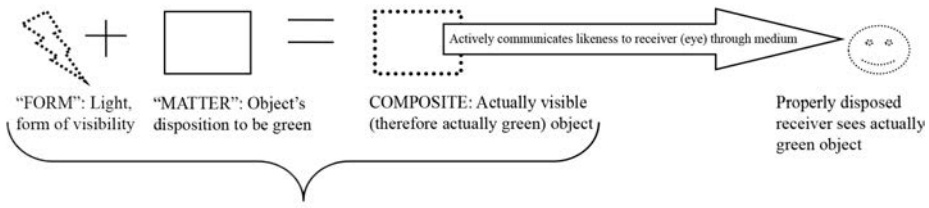
Actively communicates likeness to receiver (eye) through medium
"FORM": Light, form of visibility
"MATTER": Object's disposition to be green
COMPOSITE: Actually visible (therefore actually green) object
Properly disposed receiver sees actually green object

Figure 2 (APM_1). Light, the active principle of visibility, constitutes object qua actually visible. Actual color, qua visible, is an active principle communicating its likeness to viewer.

[28] *Liber de anima* 3.1 [Van Riet 1:173; see also 175–76].

[29] See *Liber de anima* 3.3 [Van Riet 1:188–89].

[30] *Liber de anima* 3.4 [Van Riet 1:212]: *Ergo colores habent esse, et non est esse eorum ex hoc quod sunt lux, nec lux est apparentia eorum, quamvis id quod sunt in effectu, non sunt sine luce.*

[31] See *Liber de anima* 3.6 [Van Riet 1:246]: *[S]ed dicimus quod illuminatum solet reddere formam suam sibi opposito.*

[32] *Liber de anima* 3.1 [Van Riet 1:172].

[33] *Liber de anima* 3.1 [Van Riet 1:172–73]: *Et quiddam eorum est quod eget ut sit ibi aliud quod faciat illud esse alicuius proprietatis, et hoc est coloratum.*

Whereas in APM_1 light formally constitutes the object of vision as such, giving it *the active power to affect the appropriate receiver*, medieval thinkers also found in their Arabic sources another way of construing light as active principle. On this second view, light has the role of informing *the receiver*, giving it *a disposition to be affected* by the colored object (we can call this APM_2; see Fig. 3). According to APM_2, exemplified by Aristotle and explicated for medieval authors in Averroes's *Long Commentary on De anima*, physical light is the form of transparency, and transparency is the appropriate disposition for receiving color.[34] Objects like the green vase in a dark room, Averroes explains, are actually colored (and therefore visible) by themselves. But color can only act on something that is actually transparent (among which, it seems, are included air, water, and the eye-jelly itself), and darkness is precisely the *lack* of this transparency. So, darkness in a patient "blocks" color from acting on that patient. But when I open the window-blinds, the light informs the air and my eye, making them actually transparent. With the obstacle to its action removed, the vase's color can now affect my eye through the actually transparent medium.[35]

Just as in APM_1, then, so too in APM_2 light is a form that inheres in certain entities. The difference between the two models lies in *what kind* of form light is, and what recipient it informs.[36]

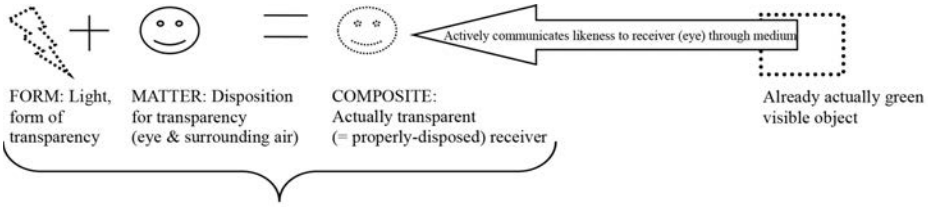
Actively communicates likeness to receiver (eye) through medium
FORM: Light, form of transparency
MATTER: Disposition for transparency (eye & surrounding air)
COMPOSITE: Actually transparent (= properly-disposed) receiver
Already actually green visible object

Figure 3 (APM_2). Light as active principle of transparency, disposing the receiver qua receiver

[34]Aristotle, *De anima* 2.7, 418a26–418a20 [Barnes, 1:665–66]; and *De sensu* 2, 438b3–16 [Barnes, 1:696–97]; Averroes, *Long Commentary* 2.66–74 [Crawford, 229–44]. Averroes presents what I take to be a faithful, if deliberately ambiguous, exposition of Aristotle's account of physical light (see Cory, "Averroes and Aquinas on the Agent Intellect's Causation of the Intelligible," 11–13). Ambiguities in his account, however, led his Latin readers to believe that Aristotle's view was compatible with Avicenna's APM_1, indicating, incidentally, their dependence on Averroes in interpreting Aristotle's theory of light. Aquinas came to regard APM_1 and APM_2 as competing models of physical illumination mid-career; see n. 37 below.

[35]See Averroes, *Long Commentary* 2.66 [Crawford, 229:10–13 and 230:22–23]; and 2.71 [Crawford, 238:12–22].

[36]It should be emphasized, however, that APM_1 and APM_2 do not exhaust their representatives' views on the role of light in vision. For instance, Avicenna not only describes light as the form of colored bodies *per* APM_1, but also gives it responsibility for making potentially transparent bodies actually transparent *per* APM_2; see *Liber de anima* 3.3 [Van Riet, 1:194]. And although Aristotle clearly endorses APM_2, he also expresses some very curious views on light and color, according to which light is described as a kind of color; see *De sensu* 3, 439a6–18, and for discussion, Vasiliu, *Du diaphane*, 39–75.

3. RETHINKING AQUINAS'S MODEL OF THE LIGHT OF THE AGENT INTELLECT

Fast-forward now to Thomas Aquinas—who, as it turns out, is no stranger to APM. From his earliest writings, Aquinas models his account of physical light on Avicenna's APM_1, but in the mid-1260s he embraces APM_2, apparently after a closer reading of Aristotle and Averroes.[37] This change of heart in theorizing about physical light does not affect his approach to intellectual light, however. Throughout his career he insists that intellectual light performs a role analogous to that of physical light in APM_1, namely, actualizing the object of cognition (as opposed to disposing the receiver per APM_2).[38] For reasons that will become clear in a moment, however, he will need to modify APM_1 in applying it to the behavior of intellectual light, so as to produce a third model, APM_3.

3.1. *APM_3 in Aquinas's Account of Intellectual Light*

Now that we know that the major theories of physical light available to Aquinas were modeled on APM, certain language woven through his account of intellectual light takes on new technical significance as intended to evoke APM. Whenever he explains what the intellectual light is and what it does, he uses phrases such as, "The agent intellect makes intelligibles-in-act [*intelligibilia in actu*, actual intelligibles]," [39] often adding an explicit comparison to light: "The agent intellect makes potential intelligibles to be actual—just like light, which makes colors that are potentially visible to be actually visible." [40] The agent intellect repeatedly figures as an "active principle" (*principium activum*), an "active power" (*potentia activa*), or a form that confers a certain causal power (*habitus*).[41]

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[37] See B. Carlos Bazán's "Introduction" to Leon. 24/1.20*–21*, stating incorrectly that Aquinas first displays awareness of APM_2 in *In De anima* 2.14 (composed c. 1267–68); in reality, Aquinas is already distinguishing between APM_1 and APM_2 in *Quaest. disp. de an.* 4, ad 4 (composed c. 1265–66; for the dating see Torrell, *Saint Thomas Aquinas* 1:335 and 341). Some representative texts for his theory of physical light and/or its relation to intellectual light are *Sent.* II.13.1.3 [Mandonnet 2:331–37]; II.20.2.2, ad 2 [514]; *De veritate* 10.8, ad 10 s.c. [Leon. 22/2.325:535–47]; *Sum. contra gent.* 2.76 [Leon. 13.481]; *Quaest. disp. de an.* 4, ad 4 [Leon. 24/1.35:180–36:207]; *In De anima* 2.14–15 [Leon. 45/1.123–34]; *In De sensu* 4–6 [Leon. 45/2.27–42]; *Sum. theol.* Ia.67.2–4 and 79.3, ad 2 [Leon. 5.163–67, 264]. For a brief overview of APM_1 in Aquinas's theory of physical light, see my *Aquinas on Human Self-Knowledge*, 147–48. On light in Aquinas more generally, see Josef Kieninger, *Das Sein als Licht*.

[38] See *Quaest. disp. de an.* 4, ad 4 [Leon. 24/1.36:201–5]; *In De anima* 3.4 [Leon. 45/1.219:43–25, 221:155–66]; *Sum. theol.* Ia.79.3, ad 2 [Leon. 5.264].

[39] *Quaest. disp. de an.* 4 [Leon. 24/1.33:110–14]: *Et cum non possit esse id quod est in potentia ad aliquid factiuum ipsius, oportet ponere preter intellectum possibilem intellectum agentem, qui faciat intelligibilia in actu, que moueant intellectum possibilem.* This language of actualization appears in every major treatment of the agent intellect, e.g. *Sent.* II.17.2.1; *Quodl.* 8.2.1; *De veritate* 10.6; *Sum. contra gent.* 2.59 and 2.76–78; *In De anima* 3.4; *Quaest. disp. de an.* 4–5; *De spirit. creat.* 10; *Sum. theol.* Ia.79.3–5; *De unitate intellectus* 5.

[40] *Sent.* II.17.2.1 [Mandonnet 2.422]: *Intellectus autem agens dicitur qui facit intelligibilia in potentia esse in actu, sicut lumen quod facit colores in potentia visibiles, esse actu visibiles.*

[41] For the language of *potentia activa / principium activum*, see for instance *De veritate* 8.8, ad 3 [Leon. 22/2.247:186–93]; *Sum. contra gent.* 2.76–77 [Leon. 13.480, 488]; *Quaest. disp. de an.* 4, ad 5 and ad 7 [Leon. 24/1.36:216–18, 36:250]. *Sum. theol.* Ia.79.4 speaks of a "formally inhering principle" that is a "power and principle of act": *Nulla actio convenit alicui rei, nisi per aliquod principium formaliter ei inhaerens . . . Ergo oportet virtutem quae est principium huius actionis, esse aliquid in anima* [Leon. 5.267]. For *habitus* as designating a principle of act, see *Sent.* I.3.5.1, ad 1 [Mandonnet 1.124]; *De veritate* 20.2 [Leon. 22/2.576:159–64]; *Sum. contra gent.* 2.78 [Leon. 13.494]; and *In De anima* 3.4 [Leon. 45/1.219:26–53].

In fact, a closer look reveals that in a number of key texts, Aquinas explains abstraction explicitly in terms of APM. For instance, the early commentary on the *Sentences* presents the agent intellect as an active principle that makes objects like itself by communicating its own form to them:

> The intellective soul . . . makes [the things it understands] actually intelligible [*faciens eas intelligibiles actu*], because not everything is actually intelligible in its own natural being, but only immaterial things. Thus material things are made intelligible by being abstracted from particular matter and its conditions [*per hoc quod abstrahuntur a materia particulari et a conditionibus ejus*], so that in some way they may be assimilated to the intellect, which is immaterial. . . . But in order for something to assimilate many things to itself, it suffices that that *thing actually have only the form according to which there is said to be a likeness*, just as by heat, fire assimilates many things to itself . . . and therefore the intellective soul can make all intelligibles by one nature of light that it actually has, without receiving anything else from another; and the power by which it effects this is active in itself [*simpliciter*], and it is called the agent intellect. (*Sent.* III.14.1.1.2, ad 2; Moos 3:437; my emphasis)

Despite employing the language of 'abstracting *from*,' which evokes subtraction, Aquinas explicitly presents the mechanism of abstraction as an *adding* or *actualizing*, per APM: intellectual light is a form or act, and abstraction is the communication of that actuality to other things. The comparison to fire is especially significant, since fire is an active principle that communicates its form (being actually hot) to many different things. In the same way, the intellectual light is an active principle that communicates its own form (the actuality of immateriality or intelligibility) to many different things, making them like itself. "The agent intellect bestows its own form on them [*formam suam eis tribuit*], making them actually intelligible."[42]

The form that the agent intellect communicates is that of sheer intelligibility or immateriality, which is not determined in itself to any specific intelligible (horseness vs. catness)—as Aquinas explains in his commentary on *De anima*, drawing a comparison to physical light under APM_1:

> The agent intellect is related to intelligibles as an act, insofar as it is an active immaterial power [*virtus activa immaterialis*], able to make other things like itself, namely immaterial. It is in this way that something intelligible in potency is made intelligible in act. It is in this way, too, that light makes colors visible, and not as though it had within itself the determinateness of all colors. (*De anima* 3:4; Leon. 45/1.221:136–66)

The phrase 'actual intelligibility' here has a very precise technical meaning. To the modern ear, 'intelligibility' sounds like a disposition or even more loosely a possibility for being understood, with 'actual' being casually added to emphasize that "it is a fact that A is correctly disposed to be understood." For Aquinas, however, intelligibility is a *certain mode of existing* that he equates with immaterial being. This mode of existing is proper to the "order of intelligibles," as distinct from the "order of natural things," which encompasses entities with a material

[42] *De veritate* 20.2, ad 5 [Leon. 22/2.577:224–26]; see also *De veritate* 10.6, ad 1 [Leon. 22/2.313:224–29]; *Sum. contra gent.* 2.76 [Leon. 13.480]: *Talis autem facit eam qualis est ipse.*

mode of existing.[43] 'Actual,' for its part, refers to the "form" or "act" that is the realization of some potency. To be actually intelligible, then, is to be realized in an intelligible, that is, immaterial, mode of existence.[44] And thus to say that the agent intellect "makes intelligibles-in-act" means that it generates entities having this intelligible/immaterial mode of existing: "The possible intellect cannot receive anything except insofar as [that thing] receives the form of intelligibility [*formam intelligibilitatis*] from the agent intellect."[45]

Under this construal, the agent intellect or intellectual light is a form of sheer intelligibility or immateriality, inhering in the individual soul.[46] It acts spontaneously under the right conditions[47] to communicate that form to other things, "immaterializing" or "intelligibilizing," as it were. In a way, none of this should really be surprising, given that Aristotle himself says that the agent intellect is "in its essential nature activity," comparing it to "a sort of positive state like light . . . [which] makes potential colours into actual colours."[48] Similarly, for Aquinas the reason the agent intellect is able to make things intelligible and immaterial is that it is already "in act" with respect to intelligibility and immateriality.

So far, the version of APM we have seen in these texts could easily be APM_1. But when Aquinas explains *how* the agent intellect immaterializes, it becomes clear that APM_1 falls short. For Aquinas, physical light and the illuminated object occupy the same physical realm, whereas the intellectual light (the sheer form of immateriality) and the phantasm (a neurophysical representation) have differing modes of existing. Consequently, he does not think that the phantasm "Marengo"

[43]For just two examples, see *Sum. theol.* Ia.14.2, ad 3 [Leon. 4.169]: *Intellectus autem noster possibilis se habet in ordine intelligibilium, sicut materia prima in ordine rerum naturalium, eo quod est in potentia ad intelligibilia, sicut materia prima ad naturalia*; and *De potentia* 7.10 [Marietti, 210]: *[I]psa res quae est extra animam, omnino est extra genus intelligibile.*

[44]See for instance *In De anima* 2.7 [Leon. 45/1.88:72–76]: *[N]am quoddam est penitus inmateriale, scilicet esse intelligibile*; *Sent.* III.14.1.1.3 [Moos 3:441]: *[R]es immateriales secundum se sunt intelligibiles in actu.*

[45]*De veritate* 18.8, ad 3 [Leon. 22/2.559:125–28].

[46]The agent intellect's status as the form of intelligibility or immateriality need not conflict with its status as a power inhering in the human soul. As Aquinas explains in *Sum. theol.* Ia.77.1, ad 5 [Leon. 5.237], the soul's powers are properties (accidental forms flowing from its essence) belonging to the category of quality. And in fact in *Quaest. disp. de an.* 5, he characterizes the agent intellect both as the intrinsic formal principle by which we make actual intelligibles (*aliquod formale principium quo formaliter operetur*) [Leon. 24/1.42:190–210], and an active power of immateriality (*quamdam uirtutem actiuam immaterialitatis*) [43:235–36]. These characterizations raise the question of whether for Aquinas powers (e.g. fragility) are identical with certain properties (e.g. molecular structure), or grounded in but distinct from those properties. But this question cannot be resolved within the parameters of the present article.

[47]According to *Sum. theol.* Ia.79.4, ad 3 [Leon. 5.268], the conditions for "making [intelligible] objects actual" are *praeter praesentiam intellectus agentis, praesentia phantasmatum, et bona dispositio virium sensitivarum, et exercitium in huiusmodi opere.* In *In Physic.* 7.3.6, he says that if there is no impediment, *statim ad praesentiam obiectorum per experimentum acceptorum, advenit (intellectui possibili) species intelligibilis, sicut speculo forma specularis ad praesentiam corporis* [Leon. 2.345, no. 9].

[48]Aristotle, *De anima* 3.5, 430a14–19 [Barnes, 1.684]. The Latin lemma for Averroes's *Long Commentary* 3.19 has, *Est in sua substantia actio* [Crawford, 440:13]; while the Moerbeke translation has *substancia [est] actu ens* [Leon. 45/1.218].

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itself can be informed by intellectual light in the way that color can be informed by physical light.[49]

Aquinas finds a solution in a modified version of APM_1 that we can call APM_3 (see Fig. 4).[50] Per APM_3, intellectual light does not transform the phantasm *itself* into an intelligible. Rather, it uses the phantasm "Marengo" to generate a new intelligible form—the intelligible species "horse"—in the intellect. In other words, the agent intellect lends to the phantasm the causal power for producing something intelligible, *without giving the phantasm itself the form of intelligibility that would normally be the basis for that causal power.*[51] With this causal "boost," the phantasm "Marengo" can impress its likeness "horse" in the possible intellect according to the agent intellect's own immaterial, intelligible mode of existing.

Under this model, agent intellect and phantasm are cooperating as primary and secondary causes of the species "horse,"[52] exemplifying a common causal arrangement in Aquinas, in which a primary, universal agent causes a secondary, particular agent's action by lending its own causal power to the latter.[53] An example

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[49] *Sum. contra gent.* 2.77 (Leon. 13.488–89): *[C]orpora naturalia, quae communicant in materia, eodem ordine agunt et patiuntur ad invicem. Anima autem intellectiva non est in potentia ad similitudines rerum quae sunt in phantasmatibus per modum illum quo sunt ibi: sed secundum quod illae similitudines elevantur ad aliquid altius*; *Quaest. disp. de an.* 2 (Leon. 24/1.18:278–81); and *Sum. theol.* Ia.85.1, ad 3 (Leon. 5.332).

[50] Incidentally, Aquinas acquires the basic structure of APM_3 from Averroes; see Cory, "Averroes and Aquinas on the Agent Intellect's Causation of the Intelligible," where I also analyze the underlying causal mechanisms at length.

[51] That is why Aquinas often speaks of the agent intellect as "illuminating the phantasms" (see *Sum. contra gent.* 2.76 [Leon. 13.481]; *De spirit. creat.* 10, ad 1 [Leon. 24/2.108:356]; *Sum. theol.* Ia.79.4 [Leon. 5.267]) or "making the phantasms actually intelligible" (*Quodl.* 8.2.1 [Leon. 25.57:93–95]; *Sum. contra gent.* 2.73 [Leon. 13.481]). He does not mean that the phantasms themselves acquire intelligible being, but rather that they acquire the causal power proper to intelligible being; see *Sum. contra gent.* 2.59 [Leon. 13.415]: *Species igitur rei, secundum quod est in phantasmatibus, non est intelligibilis actu: non enim sic est unum cum intellectu in actu sed secundum quod est a phantasmatibus abstracta; sicut nec species coloris est sensata in actu secundum quod est in lapide, sed solum secundum quod est in pupilla. . . . Et similiter phantasmata per lumen intellectus agentis fiunt actu intelligibilia, ut possint movere intellectum possibilem: non autem ut sint intellecta actu, secundum quod sunt unum cum intellectu possibili facto in actu.*

[52] See e.g. *Quodl.* 8.1.2 [Leon. 25.57:96]: *[I]ntellectus agens est principale agens*; *De malo* 16.12, ad 3 [Leon. 23.334:226–31]: *[U]nde sicut lumen dat coloribus quandam uirtutem instrumentalem faciendi immutationem spiritualem in sensu, ita et phantasmata in quantum instrumentaliter agunt in uirtute intellectus agentis, faciunt intellectum possibilem in actu intelligibilium specierum*; *Sent.* III.14.1.1.2 [Moos, 3.436]; *De veritate* 10.6, ad 7 [Leon. 22/2.314:277–92]; *Sum. contra gent.* 2.76–77 [Leon. 13.480–89].

[53] The kind of causality involved, including a comparison to the role of light, is made explicit in *Quaest. disp. de an.* 15 [Leon. 24/1.135:346–55]: *Set sicut colores non sunt uisibiles actu nisi per lumen, ita fantasmata non sunt intelligibilia actu nisi per intellectum agentem. Et hoc consonat ei quod ponimus circa generationem rerum naturalium: sicut enim ponimus quod agentia superiora, mediantibus agentibus naturalibus, causant formas naturales, ita ponimus quod intellectus agens, per fantasmata ab eo facta intelligibilia actu, causat scientiam in intellectu possibili nostro.* For Aquinas's broader treatment of the relationship between primary and secondary agents, see *De potentia* 3.7 [Marietti, 55–59]; *Sum. contra gent.* 3.66–70 [Leon. 14.188–207]; *Sum. theol.* Ia, q. 105 [Leon. 5.471–80]; and *De malo* 16.9 [Leon. 23.324:148–78]. There are different varieties of such causality; note in particular *Sum. theol.* Ia.105.5, where Aquinas differentiates between "being the cause of actions insofar as one gives the form that is the principle of action" from other types of primary causality, such as the artisan's applying an instrument's existing power to action [Leon. 5.475–76]. On secondary or instrumental causality see Meehan, "Efficient Causality," 280–82 and 317–29. I am grateful to Gloria Frost for helpful discussions on this point. For an in-depth analysis of the causal mechanisms of abstraction in Aquinas (including power-borrowing, ordered causation, *agit sibi simile* causation, and quasi-formal inherence), see Cory, "Averroes and Aquinas on the Agent Intellect's Causation of the Intelligible," 37–52.

of this kind of causality in Aquinas is God's causality of creaturely existence: "Because being [*esse*] is the common effect of all agents—for every agent makes something actually exist—it is necessary that they produce this effect insofar as they are ordered under the first agent and act in its power [*in virtute ipsius*]."[54] Electromagnetism might illustrate what Aquinas has in mind: By itself, iron does not have the ability to attract metal shavings; but with electricity running through it, iron is temporarily magnetized and gains the ability to attract metal shavings. Similarly, by channeling the immaterializing power of the agent intellect, the phantasm of Marengo acquires the enhanced power to impress on the possible intellect the immaterial likeness—intelligible species—of "horse."[55] *Per* APM$_3$, then, the intellectual light generates intelligible species in the possible intellect by means of phantasms, without *transforming* phantasms themselves into intelligibles. Or to put it another way, when "supercharged" by the power of the agent intellect, the phantasm does something that only an immaterial active principle could do (i.e. impress its immaterial, intelligible likeness on the possible intellect), without *itself* becoming immaterial:

> The phantasms do not have the same mode of existing as the human intellect, because they are likenesses of individuals and exist in corporeal organs: and therefore they cannot make an impression in the possible intellect by their own power. But by the power of the agent intellect, from its turning toward the phantasms [*ex conversione intellectus agentis supra phantasmata*] there results a certain likeness [*similitudo*] in the possible intellect that represents what the phantasms represent, but only according to the nature of the species [*est repraesentativa eorum quorum sunt phantasmata, solum quantum ad naturam specie*]. And it is in this way that the intelligible species is said to be abstracted from the phantasms, not as though some numerically identical form which was first in the phantasms later comes to be in the possible intellect, in the way in which a body is taken from one place and transferred to another. (*Sum. theol.* Ia.85.1, ad 3 [Leon. 5.332])

It is interesting that Aquinas explicitly interprets the language of 'abstraction from' as referring to the phantasm's causing the intelligible species under the power of

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[54] *Sum. contra gent.* 3.66 [Leon. 14.188], and for Aquinas's views on this point see Wippel, "Thomas Aquinas on Creatures as Causes of *Esse*." For the relationship between Divine and human causation generally, see Meehan, "Efficient Causality," 277–308; Fabro, *Participation et causalité*, 363–409, esp. 398–409.

[55] *Quodl.* 8.2.1 [Leon. 25.56:85–99]: *Set ad intellectum possibilem comparantur res exteriores sicut agencia insufficiencia: actio enim ipsarum rerum sensibilium nec etiam in ymaginatione sistit, set fantasmata ulterius mouent intellectum possibilem; non autem ad hoc ex se ipsis sufficiunt, cum sint in potencia intelligibilia, intellectus autem non moueatur nisi ab intelligibili in actu; unde oportet quod superveniat actio intellectus agentis, cuius illustratione fantasmata fiunt intelligibilia in actu, sicut illustratione lucis corporalis fiunt colores uisibiles actu. Et sic patet quod intellectus agens est principale agens quod agit rerum similitudines in intellectu possibili, fantasmata autem que a rebus exterioribus accipiuntur sunt quasi agencia instrumentalia*; *De veritate* 10.6, ad 8 [Leon. 22/2.293–302]; *Sum. contra gent.* 2.59 and 2.76 [Leon 13.415, 481]; *De malo* 16.12, ad 3 [Leon. 23.334:224–31]. The range of these texts spanning Aquinas's early to late career undermines Spruit's developmental thesis, according to which by the time of *Sum. theol.*, illuminated phantasms take on a merely passive role in abstraction (*Species intelligibilis* 1:164–65)—as well as Édouard-Henri Wéber's contrary developmental thesis, according to which the later Aquinas reconceives the agent intellect, emphasizing its causal insufficiency in producing the intelligible species; see his *Dialogue et dissensions*, 143–65 and 415–22.

the agent intellect, and warns against taking such language in the sense of a crude extraction or unwrapping.[56]

The interdependence of agent intellect and phantasm speaks to the insufficiency of the human intellect and the natural world of material beings, each on its own, to cause an act of intellectual understanding. Embodied understanding is possible only because the agent intellect and the phantasm are complementary active principles, each contributing what the other lacks for generating the intelligible species. The agent intellect is the sheer form of intelligibility, not determined to this or that intelligible such as horseness or catness (just as physical light is the sheer indeterminate form of visibility).[57] The phantasm "Marengo," for its part, is determined to a certain essence (representing something that is a horse, not a cow), but lacks the appropriate metaphysical "status" to impress its likeness on the immaterial possible intellect.[58] Thus the agent intellect and the phantasm are individually necessary and jointly sufficient for generating intelligible "horse" in the possible intellect, with the agent intellect accounting for the species's immaterial mode of existing and the phantasm accounting for its determination to 'horse.'[59]

APM_3 is thus consistent with a broader picture of causality in Aquinas, according to which "every agent makes its effect like itself [*omne agens agit sibi simile*]."[60] Because the species is produced by the cooperative activity of two ordered agents, it is "like" both. Insofar as the species has an intelligible, immaterial mode of existing, it is "like" the agent intellect (i.e. it has the form of immateriality or intelligibility—

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[56]See also *Quodl.* 8.2.1, ad 2 [Leon. 25.57:116–20], where Aquinas states that if 'abstraction' is taken literally, the mind would have to strip away dimensivity (*esse dimensionale*) from the phantasm so as to transfer the remainder into the intellect—but this would entail that the mind abstracts by annihilating material being—something that no creature can do to another creature.

[57]*Quaest. disp. de an.* 5, ad 6 [Leon. 24/1.44:317–25]: *Et primo quidem requiruntur fantasmata a sensibus accepta per que represententur intellectui rerum determinatarum similitudines, nam intellectus agens non est talis actus in quo omnium rerum determinate species accipi possunt ad cognoscendum, sicut nec lumen determinare potest uisum ad species determinatas colorum nisi assint colores determinantes uisum*; *Sent.* II.3.3.4, ad 4 [Mandonnet, 2:124]. For physical light as a *qualitas agentis universalis*, see *De 108 articulis*, q. 7 [Leon. 42.281:149–52]; and for intellectual light as a universal active principle of intelligibility, see *Sum. contra gent.* 2.78 [Leon. 13.493].

[58]See *Sum. theol.* Ia.79.4, ad 4 [Leon. 5.268]; *Quodl.* 8.2.1; *De veritate* 10.6 [Leon. 22/2.312.183–207]; *Sum. contra gent.* 2.76–77 [Leon. 13.480–89]; *In De anima* 3.4 [Leon. 45/1.221:128–66]; *De spirit. creat.* 10, ad 4 [Leon. 24/2.109:412–33], as well as the texts in nn. 61–62 below.

[59]As Cromp puts it, "That's why St. Thomas speaks of the material causality of the phantasm, not because its matter enters into the species. The agent intellect produces an intentional entity that is immaterial, universal, necessary. It projects the intelligibility, but it needs a measure, a limit to determine that spirituality. The agent intellect projects its light according to the measure of the phantasm" ("L'abstraction de l'intellect agent," 4:168); see Peifer, *The Concept in Thomism*, 119–31, who, interestingly, elaborates this causal relationship in the course of defending the X-Ray Model; and Simon, *Metaphysics of Knowledge*, 120–21, though I would hesitate to accept his characterization of the phantasm's causality.

[60]*Sum. contra gent.* 2.76 [Leon. 13.480]: *Tales autem facit [intellectus agens] eas [species intelligibiles] qualis est ipse; nam omne agens agit sibi simile.* On this maxim, see for instance *Sum. theol.* Ia.25.3 [Leon. 4.293]; and for discussion see Wippel, "Every Agent Produces Something Like Itself"; Rosemann, *Omne agens agit sibi simile*; and (on the application to abstraction) Cory, "Averroes and Aquinas on the Agent Intellect's Causation of Intelligibles," 18–20 and 37–46. See also the maxim, *Nihil autem reducitur de potentia in actum, nisi per aliquod ens actu*, used in justifying the existence of an agent intellect in, e.g. *Sum. theol.* Ia.79.3 [Leon. 5.264].

or Aquinas sometimes puts it, it is "informed" by intellectual light[61]). Insofar as it is determined to be intelligible "horse" as opposed to intelligible "squirrel," it is like the phantasm "Marengo":

> When the possible intellect acquires [abstracted, intelligible] species of things from phantasms, the phantasms are related as an instrumental or secondary agent, with the agent intellect as a principal and primary agent. And therefore the effect of the action results in the possible intellect according to the condition of both agents and not according to the condition of one or the other alone. So the possible intellect receives forms as actually intelligible from the power of the agent intellect, but as likenesses of determinate things from cognition of the phantasms. (*De veritate* 10:6, ad 7 [Leon. 22/2314:277–89])[62]

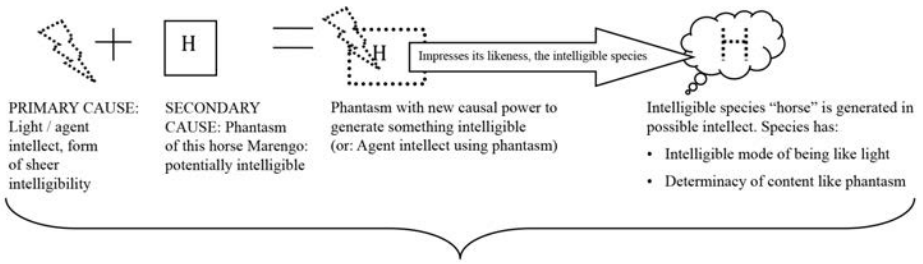
H
H
Impresses its likeness, the intelligible species
PRIMARY CAUSE: Light / agent intellect, form of sheer intelligibility
SECONDARY CAUSE: Phantasm of this horse Marengo: potentially intelligible
Phantasm with new causal power to generate something intelligible (or: Agent intellect using phantasm)
Intelligible species "horse" is generated in possible intellect. Species has:
• Intelligible mode of being like light
• Determinacy of content like phantasm

Figure 4 (APM_3). Intellectual light as active principle of intelligible being, acts in cooperation with phantasm. Phantasm acquires the *causal power for producing intelligibles,* not the form of intelligibility.

3.2. Immaterializing and Universalizing

By this point, however, it may seem that Aquinas's APM_3 neglects the most important function of the agent intellect, namely, universalizing. Indeed, the Unwrapper and X-Ray models assume that the agent intellect properly universalizes and only incidentally immaterializes, insofar as, for Aquinas, matter is what individuates (and thus separating the essence from individuating characteristics would separate it from matter). But in APM_3, the arrow runs the other way: The agent intellect properly immaterializes, with the universality of the intelligible species as a by-product of immaterialization. This is consistent with Aquinas's view that *it*

[61] *Sent.* II.20.2.2, ad 2 [Mandonnet 2.514]: *[I]n esse formali intelligibili (objectum intellectus) completur ex lumine intellectus agentis, et secundum hanc formam habet quod sit perfectio in actu intellectus possibilis*; II.3.3.4, ad 4 [147]; *De veritate* 10.8, ad 10 s.c. [Leon. 22/2.325:535–47]; *De veritate* 18.8, ad 3 [Leon. 22/2.559:125–28]; and see *Sum. theol.* Ia.87.1, where he describes the *lumen intellectus agentis, quod est actus ipsorum intelligibilium* [Leon. 5.356]. This is consistent with features of Aquinas's general account of primary and secondary and causality; see Meehan, "Efficient Causality," 298–99.

[62] Aquinas insists, however, that when one form is received through another, the two forms are ordered in a matter-form relationship, citing the relationship of light and color as an example (*De veritate* 8.14, ad 6 [Leon. 22/2.265.260–70]; *De malo* 16.12, ad 4 [Leon. 23.334:237–41]. This is why he sometimes says that in the intelligible, the likeness of the phantasm is the quasi-matter and the likeness of the agent intellect is the quasi-form (see the texts in n. 61 above, and *Sum. theol.* Ia.84.6 [Leon. 5.324]).

is materiality, not singularity, that blocks understanding; indeed, immaterial singulars such as one's own soul or angels or God can be intellectually apprehended, even though the latter higher beings are beyond the grasp of human definition.[63]

So if universality is not required for intelligibility, why does the illuminated phantasm generate a species that is "universal" or "one over many," representing "horseness" in indifference to Marengo or any other horse? The reason is that abstraction, per APM_3, negates the restriction that matter imposes on form. For Aquinas, *matter individuates by limiting*, constricting form within the boundaries of dimension and quantity, restricting it to be the form *of this horse*, not of any other horse. And for Aquinas, this holds true not only for Marengo's substantial horse-form, but also for any mental representation of Marengo that is individuated in matter. In other words, Aquinas holds the view that if an intentional form is individuated by matter, then it must *represent individually*, that is, it must represent "horse" in a determinate way as *this horse* or *that horse*.[64] An assessment of this view is beyond the scope of this paper, but his reasoning seems to be along the following lines: A form such as a phantasm or species can only represent to the fullness of its "extent" as a form; but matter restricts the form's extent, making its boundaries definite in "this much" matter, so to speak; thus a materially-individuated form can never represent beyond the boundaries of "this individual."[65] In Marengo himself, material individuation means that Marengo cannot be "more" of a horse than he is (i.e. he cannot be Marengo *and* Bucephalus). In the imagination, material individuation similarly means that the phantasm "Marengo" can never actually represent anything *more* than just Marengo.[66]

Now per APM_3, the species "horse" is caused by the illuminated phantasm impressing its likeness on the intellect. And the phantasm can act on the intellect only insofar as it is empowered by the light of the agent intellect, not insofar as it is materially instantiated. In other words, its materiality cannot have any causal impact on the possible intellect—which means that *it cannot communicate to the immaterial species its own restriction to this horse Marengo, which derives from its own*

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[63]*De unitate intellectus* 5 [Leon. 43.312:238–42]: *Non enim singularitas repugnat intelligibilitati, sed materialitas: unde, cum sint aliqua singularia immaterialia, sicut de substantiis separatis supra dictum est, nichil prohibet huiusmodi singularia intelligi*; *Sum. contra gent.* 2.75 [Leon. 13.475]; and *De spirit. creat.* 9, ad 15 [Leon. 24/2.100:576–83].

[64]See e.g. *In De anima* 2.12 [Leon. 45/1.115:83–92].

[65]This reasoning becomes clear when we juxtapose *Sum. theol.* Ia.115.1 [Leon. 5.538–39] (arguing that a thing acts insofar as it is actual, so a "form that is not determined by matter subject to quantity is a universal and indeterminate agent," whereas a form "determined to this matter is a contracted and particular agent"); and *Sum. theol.* Ia.85.2 [334] (arguing that things act according to their form, which in the case of the intellect is the intelligible species). If acts are constrained by the agent's degree of actuality; and the principle of a cognitive act is a received form; and that form is limited in what it can represent by its inherence in matter, then the scope of the resulting cognitive act will be similarly limited.

[66]Pasnau misses this point when he objects to the connection Aquinas draws between the immateriality of the species and its being a "representation of a universal" ("Aquinas and the Content Fallacy," 313). Individuality and universality do not have to do with the *content* of the phantasm and species, but rather with their *mode of existing*, which controls their *mode of representing*. The content of the phantasm represents individually, i.e. its application is restricted; whereas the content of the species represents universally, i.e. its application is unrestricted. Thus the question of whether Aquinas commits some fallacy really hinges on whether an intentional form's mode of representing can be controlled by its mode of existing.

instantiation in matter: "For prime matter receives form by contracting it to an individual being; but an intelligible form is in the intellect without any contraction of this sort. . . . For an intellectual substance is not receptive of form according to the nature of prime matter [*ex ratione materiae primae*], but rather according to a certain opposite nature [*per oppositam quandam rationem*]."[67] Released from the restriction of representing "this horse Marengo," the intelligible form represents "horse" without being restricted to any individual. That is to say, it represents universally, as a one-over-many. In this way, APM_3's "additive" model of abstraction only incidentally has a "subtracting" effect, inasmuch as the constriction imposed by matter is lost in the actualizing of immaterial being, thus freeing the resulting image of "horse" to represent any horse.

The fact that universality is parasitic upon immaterialization tells us something important about the abstracted intelligible species: Its content mirrors the content of the phantasm, except that the restriction to representing *this individual* has been lifted. If my phantasm "Marengo" includes "small, grey, fearless in battle," then the intelligible species resulting from it will have the same content. The difference is that the phantasm represents "this small, grey, four-legged, fearless, maned creature" *individually*, its content being determined to Marengo—whereas the intelligible species represents "small, grey, four-legged, fearless, with a mane" *universally*, indifferent to individuals. In short, if Marengo is the only horse I ever experience, then my understanding of "horse" will be of "something that is small, grey, four-legged, fearless, with a mane": "The intellect cognizes by abstracting from particular matter and its conditions, that is, from *this* flesh and *these* bones; but it is not necessary that it abstract from universal matter; whence it can consider the natural form in flesh and bones, just not in *these*."[68] What is omitted in the production of the species is not *content representing this individual's accidental characteristics* (e.g. color, size), but the determinacy or "individuating conditions" of the phantasm, which had restricted the way in which its content could represent: "But the intellective soul is not in potency to the likenesses of the things that are in the phantasms according to the mode in which they exist there: but according as those likenesses are raised to something higher, namely, that they be abstracted from the individuating material conditions, whereby they become actually intelligible."[69] And thus we can see why Aquinas insists that when we understand the essence of a material thing, we understand it as the kind of thing that is material and three-dimensional and has a certain kind of form—that is, we

[67] *De spirit. creat.* 1 [Leon. 24/2.13:342–54]: *Huiusmodi autem non est potentia materie prime: nam materia prima recipit formam contrahendo ipsam ad esse indiuiduale. Forma uero intelligibilis est in intellectu absque huiusmodi contractione: sic enim intelligit intellectus unumquodque intelligibile, secundum quod forma eius est in eo. Intelligit autem intellectus intelligibile precipue secundum naturam communem et uniuersalem: et sic forma intelligibilis in intellectu est secundum rationem sue communitatis; non est ergo substantia intellectualis receptiua forme ex ratione materie prime, set magis per oppositam quandam rationem.* See also *In De anima* 2.12 [Leon. 45/1.116:107–11].

[68] *De veritate* 10.4, ad 6 [Leon. 22/2.308.181–87]: *[I]ntellectus cognoscit abstrahendo a materia particulari et condicionibus eius, sicut ab his carnibus et his ossibus, non tamen oportet quod abstrahat a materia universali; unde potest considerare formam naturalem in carnibus et ossibus, licet non in his.*

[69] *Sum. contra gent.* 2.77 [Leon. 13.489].

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understand it as having a material mode of existing.[70] The intelligible species is the likeness of the phantasm, which in turn is the likeness of Marengo the horse as he is manifested to the senses, in all his materiality.[71]

Under APM_3, then, the universality of the abstracted species does not mean that the species has *a certain content* (essential as opposed to non-essential), but that it *represents in a certain way*, that is, indifferently to many individuals.[72] "That which the sense cognizes materially and concretely (which is to cognize the singular directly) the intellect cognizes immaterially and abstractly (which is to cognize the universal)."[73] In this way, Aquinas's account of abstraction preserves the dependence of intellectual content on sensory content, without having to subscribe to the problematic claim—which Geach takes to be fatal to abstractionism—that abstraction involves separating universal and particular features that are given alongside each other in sensory experience. As Geach points out, "In looking at a red window-pane I have not two sensations, one of redness and one barely of chromatic colour; there are not, for that matter, two distinct sense-given features, one of them making my sensation to be barely a sensation of chromatic colour, the other making it a sensation of redness . . . so that we can concentrate our attention upon chromatic colour and abstract from the differentia."[74] Aquinas's account of abstraction is not susceptible to this critique, since he construes universality instead as an indeterminacy of representation enabling the intelligible species to be used to think about many individuals. There is no deliberate decision in the production of such universal concepts; universalization naturally follows upon the agent intellect's immaterialization.

Abstraction as construed according to APM_3, then, is in no way an act of sorting and separating. Rather, it is the generation of something—the species—in an immaterial mode of existing, that results in the species' representing only

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[70]See *De ente et essentia* 2 [Leon. 43:370:1–371:84], especially: *In diffinitione autem hominis ponitur materia non signata: non enim in diffinitione hominis ponitur hoc os et hec caro, sed os et caro absolute que sunt materia hominis non signata*; *Sup. Boet. De Trin.* 5.2 [Leon. 50.143:87–104] and 5.3 [148:217–149:290].

[71]See *De veritate* 10.4, esp. ad 4 [Leon. 22/2.308:169–73]: *[Q]uamvis in mente non sint nisi immateriales formae, possunt tamen esse similitudines materialium rerum; non enim oportet quod eiusmodi esse habeat similitudo et id cuius est similitudo, sed solum quod in ratione conveniant*; and ad 5 [176–80]: *[Q]uamvis qualitates corporales non possint esse in mente, possunt tamen in ea esse similitudines corporearum qualitatum, et secundum has mens rebus corporeis assimilatur.* See also Cunningham, "A Theory on Abstraction in St. Thomas," 252: "[Man] is an open concept, *une notion ouverte*, since it includes the individuating notes of Socrates in a vague sort of way," although I would have said "Socrates's accidents" rather than "individuating notes."

[72]Klima, similarly, tends to speak of universality and individuality in terms of "modes of representation," although his analogy of abstracting as encoding still sets up individuality as a kind of content; see for instance his debate with Pasnau (*The Immateriality of the Human Mind*, ed. Klima and Hall, 19–28 and 37–44 respectively, especially 25, 27–28, and 40); his "Aquinas on the Materiality of the Human Soul and the Immateriality of the Human Intellect," 172–79; and his "Indifference vs. Universality," 108–9.

[73]*Sum theol.* Ia.86.1, ad 4 [Leon. 5.347]: *[V]irtus superior potest illud quod potest virtus inferior, sed eminentiori modo. Unde id quod cognoscit sensus materialiter et concrete, quod est cognoscere singulare directe, hoc cognoscit intellectus immaterialiter et abstracte, quod est cognoscere universale*; *De veritate* 2.6, ad 4 [Leon. 22/1.67:137–39]: *[E]andem rem quam cognoscit sensus, cognoscit et intellectus, nobilius tamen quia immaterialius*; *De spirit. creat.* 9, ad 6 [Leon. 24/2.98:455–56].

[74]Geach, *Mental Acts*, 37.

universally. This immateriality is not a mere absence of materiality, but a positive mode of existing in its own right. So one should think of abstraction in Aquinas as an "immaterializing," or positive generation of something that has a certain mode of existing (immaterial/intelligible), rather than as a "dematerializing," or stripping away of matter.

4. RE-READING THE PROBLEM TEXTS

Nevertheless, the interpretation I have been defending must address a set of key counter-texts in which Aquinas seems to describe abstraction as a selective consideration along the lines of the Unwrapper or X-Ray Models. I contend, however, that these texts can plausibly be read, not as identifying the agent intellect's act as a kind of selective consideration, but rather as describing intellectual operations that are performed *in virtue of* the agent intellect's species-abstraction. Before considering these texts, however, let us set forth three key distinctions that are crucial in interpreting these texts—indeed, neglect of these distinctions, in my view, is the main reason that these texts have been misread in support of the Unwrapper or X-Ray Models.

4.1. *What the Generation of the Intelligible Species is not: Three Crucial Distinctions*

First, it is crucial not to confuse *distinct cognition of an essence*—which requires an accumulation of experience and reasoned argumentation—with the *indistinct cognition of an essence* beginning from the intellect's first moment of acquaintance with that essence through an abstracted intelligible species. The agent intellect's abstraction of an intelligible species explains only why humans have any intellectual content at all, not how we attain perfect or distinct knowledge. For Aquinas, we always begin by cognizing essences indistinctly, descriptively, and confusedly, as when we understand 'human' through an accidental description as "a teachable animal that can laugh."[75] (This initial indistinctness is consistent with the APM_3 model of abstraction that, as I just noted, entails that the content of the abstracted species is indistinct and descriptive.) Indeed, for Aquinas, without this preliminary indistinct apprehension, we would not be motivated to seek further understanding.[76] We attain a distinct, definitional cognition of "human" as "rational animal," however, only through a long process of experience-gathering and reasoned argument.[77]

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[75] *In Poster* 2.8 [Leon. 1*/2.203:92–130]; see also *Sup. Boet. De Trin.* 6.3, where Aquinas distinguishes a "perfect cognition" of an essence according to its definition, from a "confused cognition" in which one grasps a thing's essence *secundum cognitionem alicuius generis proximi uel remoti, et aliquorum accidentium que extra apparent de ipso* [Leon. 50.167:114–168:129].

[76] See *Sent.* I.6.1.3, *expositio textus* [Mandonnet, 1.170].

[77] On the gathering of experience, see the explication of *In Post. An.* 2.20, below. On the role of reasoning, see *In Physic.* 1.1.1 [Leon. 2.5–6, nos. 6–11]; *Sum. theol.* Ia.85.3 [Leon. 5.336–37]; *In Meteor.* I, Prooem. [Leon. 3.1–2, nos. 1–2]. For discussion of the journey from indistinct to distinct cognition, see Simon, *Metaphysics of Knowledge*, 119, n. 35; O'Callaghan, *Thomist Realism*, 222–24; Pasnau, *Aquinas on Human Nature*, 324–29; Cory, *Aquinas on Human Self-Knowledge*, 77–83.

Second, one should not confuse the intellectual operation of "considering" with the activities of the agent and possible intellects. "Considering" (*consideratio, considerare*) is what an intellect properly speaking *does*, that is, understand or think about something simple or complex[78] (in other operations such as judging and reasoning, the intellect moves toward more developed understanding[79]). This operation is not reducible to the activities of either agent or possible intellect alone. Instead, the latter "concur in the single act of understanding," with the agent intellect illuminating, and the possible intellect receiving, the intelligible species.[80] Consequently, the intellect's act of considering or understanding does not *produce* the intelligible species, but itself occurs in virtue of an abstracted species. (And in fact, one of the problems of the X-Ray Model is that its defenders often problematically end up turning the agent intellect into an autonomous intellectual subject that "sees through" particularity and "selectively considers" the universal.[81] Such a view makes it hard to see why intelligible species, or a possible intellect for that matter, should play any role in cognition.[82])

The third and most crucial distinction needs to be unpacked in some depth: namely, the distinction among three ways in which Aquinas uses the term 'abstraction' (*abstractio, abstrahere*) in discussing intellectual activity:

- Abstraction$_{ai}$: the agent intellect's activity of generating intelligible species via phantasms, which is the necessary condition not only for one's initial intellectual acquaintance with "horse," but also for any further development in one's understanding of horses;
- Abstraction$_{c}$: the human mode of cognizing essences without being able to grasp what individuates them;
- Abstraction$_{o}$: an intellectual operation in which the intellect deliberately draws distinctions in the process of refining its indistinct cognition.

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[78]See *Sum. theol.* Ia.79.6 and 89.5–6 [Leon. 5.270–71, 279–81]; Ia-IIae.57.1 [Leon. 6.364]; and *In Physic.* 7.3.6 [Leon. 2.344, no. 6]. Curiously, this more fundamental meaning is neglected in Deferrari and Barry's *Lexicon* (s.v. *considero*, 216), which focuses rather on the subsidiary meaning of *consideratio* as an extended attention, e.g. pondering or meditating.

[79]See *Sum. theol.* Ia.58.3–4 and Ia.85.5 [Leon. 5.83–85, 341].

[80]On the concurrence of the agent intellect's and the possible intellect's acts in one operation, see *Quaest. disp. de an.* 4, ad 8 [Leon. 24/1.36:255–37:262]: *[D]uorum intellectuum, scilicet possibilis et agentis, sunt due actiones. Nam actus intellectus possibilis est intelligibilia recipere; actio autem intellectus agentis est abstrahere intelligibilia. Nec tamen sequitur quod sit duplex intelligere in homine, quia ad unum intelligere oportet quod utraque harum actionum concurrat*; *Sent.* I.3.4.5 [Mandonnet, 1.122]: *[O]mne quod intelligitur, non intelligitur nisi illustratum lumine intellectus agentis, et receptum in intellectu possibili*; and *De veritate* 10.8, ad 11 s.c. [Leon. 22/2.325:560–326:570]. When Aquinas does attribute *considerare* or *percipere* to just one of these powers, it is never the agent intellect; see *In De anima* 3.4 [Leon. 45/1.220:101–4]; *De spirit. creat.* 10 [Leon. 24/2.106:265–68].

[81]For example, Degl'Innocenti describes the agent intellect in language more appropriate to Aquinas's teacher Albert, as "an abstracting gaze, which in the manner of a natural habit always accompanies the essence of the soul like an always-open eye" ("L'enimma dell' intelletto agente," 38 and 40; my translation). See also Kerr, "Ontological Commitment and Thomistic Realism," 228–29; and even Kenny, describing the agent intellect as a "capacity to think, specified by exercise" (*Aquinas on Mind,* 47). Against such views, see Cromp, "L'abstraction de l'intellect agent," 2:16.

[82]See Braine's attempt to fit the intelligible species into a selective-consideration account as the intellect's "capacity to ignore the appropriate irrelevant features of an idea" ("The Active and Potential Intellects," 27).

Textual support for the Unwrapper or X-Ray Models, in my view, arises from reading Aquinas's discussions of abstraction$_o$ or abstraction$_c$, as though they made claims about abstraction$_{ai}$.

For instance, Aquinas sometimes uses the term 'abstraction' to designate the mode of human cognition (=abstraction$_c$). As discussed above, because the agent intellect and phantasm can only produce an abstracted$_{ai}$ species that represents "horse" universally, the resulting human intellectual operation can never encompass what makes Marengo be Marengo (in contrast to angels and God, whose understanding of "horse" includes all individual horses contained under that universal). Consequently, humans have a characteristically limited mode of intellectual cognition from which particularization is missing. It seems to me that it is to this *limited intellectual consideration available to humans by means of abstracted$_{ai}$ species,* and not to the mechanism whereby agent intellect and phantasm cause the species, that Aquinas is referring, when, for example, he describes the human intellect "understanding the universal nature by abstraction from individuating principles"[83] or universals existing "only in the consideration of the intellect abstracting the common from the proper."[84]

Again, Aquinas also frequently uses 'abstraction' to refer to acts of selectively drawing distinctions within conceptual content (=abstraction$_o$). A case in point is *Sup. Boet. De Trin.*, q. 5, a. 3. There Aquinas outlines "three kinds of distinction" that seem to involve some sort of selection, and that are performed by two kinds of intellectual operation, as follows:[85]

(1) *Abstraction$_o$ by apprehension.* In apprehension, the "first intellectual operation," the intellect grasps something that is "one" in some way. To abstract$_o$ by apprehension is to focus attention on one aspect of an object while leaving out another aspect (the omitted aspect cannot be essential to understanding the retained aspect, however). This abstractive$_o$ apprehension is divided into two kinds. The first is (1a) "The abstraction$_o$ of the whole from the part," which produces concepts for use in the natural sciences. Here, parts that do not belong to the essence are left aside, as when I consider man only *qua* rational animal, without specifying anything about feet, hands, and so forth. The resulting universal "man" retains what Aquinas calls "sensible matter," that is, the qualities that make objects

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[83] *De unitate intellectus* 5 [Leon. 43.312:216–25]: *[Species] autem, cum sit abstracta a principiis indiuidualibus, non representat rem secundum condiciones indiuiduales, sed secundum naturam uniuersalem tantum. Nichil enim prohibet, si aliqua duo coniunguntur in re, quin unum eorum representari possit etiam in sensu sine altero: unde color mellis vel pomi uidetur a uisu sine eius sapore. Sic igitur intellectus intelligit naturam uniuersalem per abstractionem ab indiuidualibus principiis.*

[84] *In Metaph.* 11.2 [Marietti, 514, no. 2174]: *Et veritas haec est, quia nihil est in rerum natura praeter singularia existens, sed tantum in consideratione intellectus abstrahentis communia a propriis* and 3.9 [Marietti, 125, no. 446]*: Nam intellectus immaterialiter cognoscit materialia: et similiter naturas rerum, quae singulariter in rebus existunt, intellectus cognoscit universaliter, idest absque consideratione principiorum et accidentium individualium.*

[85] *Sup. Boet. De Trin.* 5.3 [Leon. 50.146:87–149:290]. For discussion, see Geiger, "Abstraction et séparation"; and Wippel, *Metaphysical Thought,* 44–48. Parallel texts are *De veritate* 2.6, ad 1 [Leon. 22/1.96–119]; *In Physic.* 2.2.3–4 [Leon. 2.61–67]; *In Metaph.* 3.2 [Marietti, 99–100, nos. 347–53], and 3.7 [117, no. 442]; *Sum. theol.* Ia.40.3 [Leon. 4.416], and Ia.85.1, ad 1 [5.331]; and *Compendium theologiae* 1.61–62 [Leon. 42.101].

accessible to the senses. In other words, I properly understand "rational animal" as the kind of thing that has surface area, color, and so forth. The second kind of abstractive$_o$ apprehension is (1b) "The abstraction of form from matter," which produces concepts for use in the science of mathematics. Here "sensible matter" is left aside, as when I consider 'line' purely as quantified substance, that is, as a pure mathematical figure apart from any notion of color or surface area.

(2) *Negative judgment or "separation"* (sometimes also called an abstraction$_o$, as in *Sum. theol.* Ia.85.1, ad 1 below[86]). Separation produces concepts for use in the science of metaphysics. In judgment, the "second intellectual operation," the intellect constructs affirmative or negative propositions about things as they exist in reality. A judgment is abstractive$_o$ when it "separates" intelligibles from each other, as when I judge that "man is not white" or "man is not an ass."

Now Aquinas clearly identifies (1) and (2) as intellectual operations of apprehending and judging, that is, abstractions$_o$.[87] And the intellectual operation, as we just saw, *depends on* the combined activities of agent and possible intellects: "Each of these operations presupposes the intelligible species, by which the possible intellect is actualized."[88] These distinguishing operations, then, cannot be responsible for abstracting$_{ai}$ species. Rather, they are acts that *presuppose*, and are performed in virtue of, the presence of an already-abstracted$_{ai}$ species. More specifically, they are acts in which the knower deliberately works to refine her concepts, in attempting to achieve the definitions required in scientific inquiry.[89] In fact, Aquinas typically mentions such acts of distinguishing when he is discussing the attainment of scientific knowledge or defending our abstractive$_c$ mode of cognition—not when he is explaining the behavior of the agent intellect as a psychological mechanism. (And it is worth noting that neither type 1a nor type 1b manifest the kind of selective consideration proposed by the X-Ray Models, that is, a straightforward isolating of essential content given alongside inessential content in sensation. For instance, in describing type 1a Aquinas insists that *the whole species,* rational animal, is abstracted from its various parts; it is not as though one part of the content of some whole is considered separately from another part.[90])

So why is abstraction$_o$ so often confused with abstraction$_{ai}$? The fault lies with two misleading formulations. First, Aquinas occasionally describes the agent intellect as abstracting intelligible forms from matter, using language that evokes

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[86]Occasionally, conversely, abstraction$_o$ is described as "severing" (*secernere*); e.g. *De spirit. creat.* 10 [Leon. 24/2.106:262–64], and *De veritate* 10.6, ad 2 [Leon. 22/2.313:236–38].

[87]*Sup. Boet. De Trin.* 5.3 [Leon. 50.147:90–95]: *[D]uplex est operatio intellectus: una que dicitur intelligentia indiuisibilium, qua cognoscit de unoquoque quid est, alia uero qua componit et diuidit, scilicet enuntiationum affirmatiuam uel negatiuam formando.* On these two operations, see *In Peryerm.* 1.1 [Leon. 1*/1.5:1–32]; *Sum. theol.* Ia.16.2 [Leon. 4.208], and Ia.85.2, ad 3 [5.334–35]; *In De anima* 3.5 [Leon. 45/1.224–28].

[88]*De spirit. creat.* 9, ad 6 [Leon. 24/2.97:427–30].

[89]Geiger emphasizes the scientific, logical character of abstraction$_o$ in "Abstraction et séparation," 150–52 and 170. The distinction between the prescientific abstraction$_{ai}$ and the scientific abstraction$_o$ sometimes appears in neoscholastic literature as the distinction between "abstraction by the agent intellect" and "abstraction by the possible intellect"; see Cunningham, "A Theory on Abstraction in St. Thomas," 270; but this phrasing incorrectly assigns intellectual operations exclusively to the possible intellect.

[90]See n. 115 below.

the mathematical abstracting$_{o}$ of form from matter (type 1b above).[91] But despite the shared terminology, these cannot be the same event—otherwise Aquinas would have to hold that the agent intellect only abstracts species of mathematicals! Moreover, his mathematical abstraction$_{o}$ presupposes prior knowledge requiring a previously-abstracted$_{ai}$ species: A child must already intellectually grasp "line" as having sensible properties such as color and area ("sensible matter"), before she can learn to conceptualize "line" as a mathematical object, abstracting from all properties except quantity.

Second, Aquinas applies the phrase 'abstracting the universal from the particular' both to the agent intellect's activity and to the "abstraction$_{o}$ of the whole from the part" (type 1a above).[92] The difference between these two is evident, however, when we take a closer look at *Sup. Boet. De Trin.* 5.3. Aquinas there explains that we can abstract$_{o}$ the universal only from those parts that are not essential to the definition. For instance, "man" can be abstracted$_{o}$ from "finger," "foot," and "hand," but not from "rational soul" and "body mixed from the elements with the proper mixture required for such a form." Now if he intended to describe how the agent intellect abstracts$_{ai}$ the species "man" from the phantasm "Socrates," the result would be that we *could never intellectually grasp* "finger," "foot," and "hand," because these would be precisely the non-essential parts that the agent intellect would have to leave out in generating the species "man." But obviously Aquinas does not intend any such thing; he has just finished discussing how we *do understand* "foot" in relation to "animal."'[93] So the abstraction$_{o}$ of universal "man" (making no claims about feet) from "man-as-having-two-feet" cannot be identical with the abstraction$_{ai}$ of the species "man" from the phantasm "Socrates." Instead, Aquinas is here describing a later, deliberate activity of distinguishing the essential from the inessential, an important stage in working out the definition of "man."

One might object, however, that even if abstraction$_{ai}$ must be kept distinct from abstraction$_{o}$, they are at least the same *kind* of act. After all, in our text from *Sup. Boet. De Trin.* 5.3, after discussing the abstraction$_{o}$ of "man" from "feet" or "fingers," Aquinas goes on to draw a comparison to the abstraction of the universal "man" from the particular "this here and now" of Socrates—a loss of determinacy that, as we know, occurs when the phantasm and agent intellect produce the intelligible species:

> These parts [finger, foot, hand] are called the parts of matter, which are not placed in the definition of the whole, but rather the other way around. And in this way all signate [i.e. individuated] parts are related to man, such as this soul and this body and this fingernail and this bone and so forth . . . and therefore "man" can be

[91] E.g. *Sent.* 4.49.2.1; *Sum. contr. gent.* 1.44; *Sum. theol.* Ia.55.2, ad 2, etc., apparently using 'intelligible form' as a stand-in for 'essence' (see *De ente et essentia* 1 [Leon. 43.369:27–36], and Wippel, *Metaphysical Thought*, 327–30). Hence Schütz's *Thomas-Lexikon*, s.v. *abstrahere*, (c)8, and Deferrari and Barry's *Lexicon*, s.v. *abstraho*, (h), erroneously identify the "abstraction of species from matter" with the mathematical "abstraction of form from matter."

[92] E.g. *Sum. theol.* Ia.44.3, ad 3 [Leon. 4.460]: *Nos enim, per virtutem intellectus agentis, abstrahimus species universales a particularibus conditionibus*; and the text cited at n. 94 below.

[93] *Sup. Boet. De Trin.* 5.3 [Leon. 50.147:138–41]: *[Pes] non potest intelligi sine intellectu animalis, quia illud a quo pes habet rationem pedis dependet ab eo a quo animal est animal.*

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> abstracted by the intellect from these parts. And such abstraction is the abstraction of the universal from the particular. (*Sup. Boet. De Trin.* 5.3 [Leon. 50.149:229–39])[94]

It seems to me, however, that this text can plausibly be read as comparing the *results* of abstraction$_{o}$ and abstraction$_{ai}$, rather than suggesting that they are the *same kind of act caused by the same process of content-selection.* No matter how they occur, abstraction$_{ai}$ and abstraction$_{o}$ have the same result: Both conclude in an act of considering "man" which does not fully capture the Socrates of our sensory experience (whether this is his "this here and now" or his "having feet"). None of this need imply that abstraction$_{ai}$ is merely a selective consideration, like abstraction$_{o}$. Rather, Aquinas is arguably comparing the natural incompleteness of our intellectual representations of "man" (due to the human mode of abstractive$_{c}$ cognition by means of an abstracted$_{ai}$ species), to the partiality that we further impose on a concept through abstraction$_{o}$, attempting to define its boundaries by omitting from consideration human parts that we believe to be non-essential. Indeed, he elsewhere identifies non-determinacy as a general condition of all human understanding, quite apart from the additional abstractions$_{o}$ proper to the natural sciences and mathematics.[95]

4.2. APM$_{3}$ vs. the X-Ray Model

With these distinctions in mind, let us turn to the two texts that are most often cited in support of the X-Ray Model. In *Sum. theol.* Ia.85.1, ad 1, Aquinas writes,

> It must be said that abstraction happens in two ways. In one way, by composition and division, as when we understand that something is not in another thing, or that it is separate from it. In another way, by simple and absolute consideration, as when we understand one thing without considering another. Therefore falsity occurs in the intellect's abstracting those things that are not abstract in reality, according to the first way of abstracting. But there is no falsity in the second way of abstracting those things that are not abstract in reality, as is clear in the case of sensible objects [he gives the example of considering color apart from the colored apple]. . . . Similarly, I say that those things that pertain to the account [*ratio*] of a species of any material thing, namely of a stone or a man or a horse, can be considered without the individual principles, which do not belong to the account of the species. And this is to abstract the universal from the particular, or the intelligible species from the phantasms: namely,

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[94] 'This abstraction' (*talis abstractio*) is clearly intended to apply to any abstraction from the "parts of matter," including not only "this" but also "foot," etc.—as is made clear when he later clarifies that this kind of *abstractio* is the "*abstractio totius in quo consideratur absolute natura aliqua secundum suam rationem essentialem, ab* omnibus partibus [emphasis mine] *que non sunt partes specie set sunt partes accidentalis* (243–47).

[95] *De veritate* 2.6, ad 1 [Leon. 22/1.66:96–119]: *[D]uplex est materia a qua fit abstractio, scilicet materia intelligibilis et sensibilis, ut patet in VII Metaphysicae, et dico intelligibilem ut quae consideratur in natura continui, sensibilem autem sicut est materia naturalis; utraque autem dupliciter accipitur; scilicet ut signata, et ut non signata, et dico signatam secundum quod consideratur cum determinatione dimensionum harum scilicet vel illarum, non signatam autem quae sine determinatione dimensionum consideratur. Secundum hoc igitur sciendum est, quod materia signata est individuationis principium a qua abstrahit omnis intellectus secundum quod dicitur abstrahere ab hic et nunc; intellectus autem naturalis non abstrahit a materia sensibili non signata: considerat enim hominem et carnem et os, in cuius diffinitione cadit sensibilis materia non signata; sed a materia sensibili totaliter abstrahit intellectus mathematicus, non autem a materia intelligibili non signata. Unde patet quod abstractio quae est communis omni intellectui facit formam esse universalem.*

> to consider the nature of the species without considering the individual principles that are represented by the phantasms. (*Sum theol.* Ia.85.1, ad 1 [Leon. 5.331])

Now that we understand Aquinas's general use of 'consideration' (*consideratio*) and 'abstracting' (*abstrahere*), it is immediately clear that he is here describing the distinguishing operations, or "abstraction$_o$" by apprehension and judgment. So then why does the concluding sentence identify "abstracting the intelligible species from the phantasm"—the work of the agent intellect—with "considering the nature without considering the individual principles represented by the phantasms"?

A glance at the context clarifies the situation. Q. 85 as a whole studies "the mode and order of [human] understanding." So Aquinas begins in a. 1 by distinguishing the human mode of cognizing essences from other modes of cognition, asking whether we "understand material and corporeal things by abstraction from phantasms" (in other words, whether human understanding is abstractive$_c$). In the corpus of q. 85, a. 1, he explains that the senses access individual horses; higher intellects such as God and angels cognize "horse" via an intelligible species that positively includes all individual horses. The human intellect, however, grasps "horse" as indifferent to individual horses, for reasons that we have already discussed. Thus it makes sense that Aquinas would feel obliged to address—as he does in ad 1—the worry that abstractive$_c$ cognition would be essentially deceptive. As the objection runs, if humans can only cognize "horse" apart from that which makes Marengo or Bucephalus be *this or that* horse, we do not cognize "horse" as it really is.

The point of Aquinas's response in ad 1, then, is not to explain *how the intellectual light produces species from phantasms* (which he had already discussed in q. 79 anyway). Rather, its goal is to legitimize the human abstractive$_c$ mode of cognition, which is always partial because it results from abstracted$_{ai}$ species and further operations of abstraction$_o$. Thus the concluding phrase 'to abstract the universal from the particular, or the intelligible species from the phantasm,' can be rephrased as 'to cognize essences in the human way, by having abstracted, etc.' This cognition with a limited scope (abstraction$_c$) does not *explain* but rather *results from* the agent intellect's abstracting$_{ai}$ of species, as is clear from ad 4 in the same article: "The agent intellect abstracts intelligible species from phantasms inasmuch as *by the power of the agent intellect, we can receive in our consideration* the natures of species without individual conditions, according to whose likenesses the intellect is informed."[96]

Our second problem text is Aquinas's commentary on *Posterior Analytics*, bk. 2, lect. 20. This text is representative of a group of texts that identify "experience" (*experientia, experimentum*—that is, a familiarity, developed over time, with patterns exhibited by sets of individuals) as the precondition for abstracting universals:[97]

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[96] *Sum. theol.* Ia.85.1, ad 4 [Leon. 5.332]: *Abstrahit autem intellectus agens species intelligibiles a phantasmatibus, inquantum per virtutem intellectus agentis accipere possumus in nostra consideratione naturas specierum sine individualibus conditionibus, secundum quarum similitudines intellectus possibilis informatur.* The same applies to the discussion of abstraction and selective consideration in *De unitate intellectus* 5, see n. 83 above; or *In Physic.* 2.2.3 [Leon. 2.62, no. 5].

[97] For parallel discussions of experience, see *Sent.* III.14.1.3.3 [Moos, 3.459–60]; III.34.1.2 [Moos, 3.1117]; *Sum. contra gent.* 2.83 [Leon. 13.522]; *In Metaph.* 1.1 [Marietti, 8, nos. 15–16]; and *In Ethic.* 6.3 [Leon. 47/2.341:81–92]. Another set of similar texts centers on the principle that acquiring

> From memory . . . in diverse singulars, there comes to be experience; for experience seems to be the reception of something from many held in memory. But experience requires some reasoning about particulars such that one is joined to another, which is proper to reason; for instance, when someone remembers that such a plant in many cases healed many from fever, he is said to have experience that such a plant heals fever. But reason does not remain fixed in the experience of particulars; rather, from many particulars in which someone is experienced, he receives some common "one" which is stabilized in the soul, and considers it without considering any one of those singulars, and takes it as a principle of art and of science. For example, when a physician has considered that this herb heals feverish Socrates and feverish Plato and many other singular men, he has experience; but when his consideration ascends to the notion that this species of herb heals the feverish simply speaking, he takes it as a certain rule of the art of medicine. . . . For that which is said to be one over many [*unum praeter multa*] is not [so] in its being, but according to the consideration of the intellect, which considers some nature, namely 'man,' without looking to Socrates or Plato. . . . Therefore from this experience and from such a universal received by experience, there is in the soul the principle of art and science. (*In Poster.* 2.20 [Leon. 1*/2.244:147–245:195])

A few lines later, Aquinas indicates that this process cannot occur by merely passive impression from the senses, but requires a possible intellect that is "receptive of universal cognition" and an agent intellect "that makes intelligibles actual by abstracting universals from singulars."[98] He then goes on to repeat in even stronger terms:

> For if many singulars are received which are indifferent with respect to something one existing in them, that one according to which they do not differ, received in the soul, is the first universal [*primum universale*], whatever it may be, whether it pertains to the essence of the singulars or not. [He gives the example of grasping 'white' and 'rational' as universals with respect to which many humans are found to be indifferent]. . . . In this way, then—namely by the way of induction—the sense makes a universal within the soul, insofar as all singulars are considered [*Sic enim, scilicet per viam inductionis, sensus facit universale intus in anima, in quantum considerantur omnia singularia*]. (*In Poster.* 2:20 [Leon. 1*/2.246:243–87])

Such pronouncements have suggested to some of Aquinas's readers that the agent intellect is a pattern-recognition mechanism that generates a species by highlighting the common features across many phantasms.[99] This variant on the X-Ray Model avoids the criteriological problem, because the agent intellect need not "decide" which features to isolate within one phantasm; rather, common patterns simply emerge in comparing phantasms, just as when light shines through a stack of diagrams on tracing paper, one sees the common structures in various diagrams aligning. Under this construal, cognition of essences implies cognition of what is common to many, and cannot be achieved from encountering just one individual.

But in Aquinas, pattern-recognition and the acquiring of "experience" is not, strictly speaking, an activity of the intellect, but a sub-intellectual activity that occurs

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intellectual habits requires experience: e.g. *In Ethic.* 2.1 [Leon. 47/1.77:55–56]: *Intellectualis virtus indigeat experimento longi temporis.*

[98] *In Poster.* 2.20 [Leon. 1*/2.246:223–35].

[99] Lonergan, *Verbum*, 81; Mayer, "Apriori or Aporia?" 725–33.

only in humans. This sort of collating is proper to the human being, and pertains to the (sub-intellectual) cogitative power, which is called "particular reason" and which collates individual intentions just as universal reason collates universal intentions.[100] It seems to me that *In Poster.* 2.20 provides a glimpse of one factor in the long and messy process whereby the intellect, working together with the imagination, refines its indistinct cognition and arrives at a distinct cognition of the definition. What we see in the "abstracting of the universal from experience of particulars" is not how the agent intellect produces a species for the first time, but rather how *patterns of commonality* are perceived, understood, and eventually worked into a definition.

In fact, for Aquinas, the human imagination[101] is not merely passive to impressions from the senses, but actively divides, recombines, and collates phantasms under the influence of reason.[102] As a result, imagination cooperates with intellect in the process of knowledge-refinement:

> In the imagination there are not only forms of sensible things according as they are received from the sense, but they are changed in various ways, either because of some corporeal change, as happens to those sleeping or the insane, or also because the phantasms have been disposed by the command of reason in a way that is ordered toward that which is to be understood. For just as diverse meanings are taken from diverse arrangements of the same letters, so too from diverse dispositions of the phantasms there results in the intellect diverse intelligible species. (*Sum. theol.* IIa-IIae.173.2 [Leon. 10.386])[103]

The light of the agent intellect seems to remain an integral part of this process,[104] presumably immaterializing each new rearrangement of content presented by the imagination and thus ensuring that as the phantasms become more orderly, the content of the intelligible species follows suit. "Just as the confusion of colors causes

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[100]See *In Metaph.* 1.1 [Marietti, 8, nos. 15–16], esp: *Huiusmodi autem collatio est homini propria, et pertinet ad vim cogitativam, quae ratio particularis dicitur: quae est collativa intentionum individualium, sicut ratio universalis intentionum universalium*; and *Sum. theol.* IIa-IIae.47.3, ad 3 [Leon. 8.351]. On the concept of experience in Aquinas see Lutz-Bachmann, "'Experientia' bei Thomas von Aquin"; and King, "Two Conceptions of Experience," 10–11, although the latter conflates it with the agent intellect's basic abstraction$_{ai}$ of species.

[101]I use the term 'imagination' loosely, as Aquinas often does, to signify the whole group of internal sense powers: common sense, imagination proper, memory, and cogitative power. Speaking precisely, collation of phantasms is performed by the cogitative power (particular reason); but recombination of phantasms is performed by the imagination proper. On the terminological ambiguity in Aquinas, I am indebted to Daniel De Haan. On the internal senses in Aquinas, see di Martino, *Ratio particularis*; Black, "Imagination and Estimation," 59–75; Klubertanz, *Discursive Power*; Péghaire, "A Forgotten Sense," 123–40 and 210–229.

[102]*Sum. theol.* Ia.78.4 [Leon. 5.255–57] and Ia-IIae.17.7 [6.122–23]; *In De anima* 2.13 [Leon. 45/1.121:191–122:222]; 3.10 [250:83–92].

[103]See also *Sum. theol.* Ia.85.7 [Leon. 5.344]; *Sent.* IV.17.1.3.3, ad 3 [Moos, 4.842].

[104]*Quaest. disp. de an.* 15 [Leon. 24/1.136:390–97]: *[A]d hoc quod eius* [i.e. the human soul's] *cognitio perficiatur et distinguatur per singula, oportet quod a singulis rebus scientiam colligat ueritatis; lumine tamen intellectus agentis ad hoc necessario existente, ut altiori modo recipiantur in anima que sint in materia*; *De veritate* 12.1, arg. 9 [Leon. 22/2.366:85–90]: *[S]ed ex virtute luminis intellectus agentis et habitu scientiae adiuncto etiam ministerio imaginativae virtutis possumus formare tot species quot sunt nobis necessariae ut exeamus in actualem considerationem eorum ad quae habitus se extendit* (Aquinas's response shows that he accepts this process). See also O'Callaghan, *Thomist Realism*, 224.

indeterminacy and confusion in the act of the power of sight, so too the confusion of the phantasms causes a certain confusion in the act of the intellective power; which is why children at the beginning have confused cognition, and afterwards through the passage of time they cognize each thing distinctly."[105]

One might plausibly reconstruct the doctor's "abstraction of the universal from experience" in *In Poster.* 2.20, then, as follows. Through a phantasm acquired from sensory experience, the doctor encounters the plant as "this individual with such-and-such a taste, that cures feverish Socrates." This phantasm, borrowing the immaterializing power of the agent intellect, generates an intelligible species representing "the kind of plant with such-and-such a taste, that cures the feverish," which is universal in the sense of representing indifferently to this or any other individual. Through repeated sensory encounters with such plants, however, the doctor acquires "experience," that is, an aggregate imaginative impression of this plant as "curing this, that, or the other feverish patient," to the point of developing an expectation that this pattern will continue in the future. A species abstracted$_{ai}$ from this "experience" represents "plant that cures human fever," not only with the usual indifference to individuals, but also with a sense of "curing human fever"' *as a property common to or typical of many individuals* (and presumably one would then have to continue on to determine through reasoning whether this and other properties are truly essential or not). It is this sort of universal, one that goes beyond mere indifference to commonality, that provides the starting-point for arts and sciences.[106]

5. APM$_3$ AND AQUINAS'S ACCOUNT OF ABSTRACTION

The argument of this paper so far should give us reason to suspend judgment when we find the language of "abstraction from" in medieval theories of cognition.[107] An array of causal models were available to medieval thinkers that significantly complicate the traditional rationalist-empiricist dichotomy. A medieval thinker might hold that intellectual cognition is caused wholly or in part by sensory experience, without holding that intentional content is *extracted* from sensory experience in the manner of an unwrapping or x-raying. Indeed, as it turns out, in Aquinas, the phrase 'the species is *abstracted from the phantasm*' must be read in

[105] *Sent.* II.20.2.2 [Mandonnet, 2.514]; see also ad 4 [515].

[106] Interestingly, in *Sum. contra gent.* 1.50 [Leon. 13.144–45], Aquinas describes knowledge of whether an essence is common to many as characteristic of perfect knowledge (*scientia*): *Quicumque scit naturam aliquam, scit an illa natura sit communicabilis: non enim animalis naturam sciret perfecte qui nesciret eam pluribus communicabilem esse.* See also *In Metaph.* 7.7 [Marietti, 349, no. 1428], where he treats commonality and indeterminacy as distinct properties of "man": *Homo vero significat quale quid, quia significat formam communem et indeterminatam, quia significat absque determinatione huius vel illius.*

[107] This caveat is specially relevant to the ongoing scholarly dispute about Avicenna's cognition theory. For "abstractionist" dissenters from the traditional "occasionalist" reading of Avicenna, see Hasse, "Avicenna's Epistemological Optimism," also suggesting that a new way of thinking about "abstractionism" is needed in interpreting Avicenna; and McGinnis, "New Light on Avicenna." For a defense of the traditional reading, see Black, "How Do We Acquire Concepts?"

a less-than-literal sense to mean "the species is *caused by the phantasm according to an abstract (i.e. immaterial) mode of existing*."[108]

In this final section, I want to consider briefly the broader implications of APM_3 for abstraction, beginning with the three standard objections to abstraction described in the first section above, and then examining how APM_3 sets the stage for a later kind of abstraction in which we refine and define our concepts.

As it turns out, APM_3 fares quite well with respect to the three standard objections to abstraction. The first was the transmission problem: namely, how can the senses convey the essence "horse" to the intellect, when the essence is not an object of sensation in the first place? As we have seen, APM_3 does not assume that some prepackaged essence is smuggled into the phantasm under the cover of accidents. Rather, the agent intellect and phantasm produce a species whose content faithfully reflects the phantasm's content without any constriction to represent *this* rather than *that*, and the definition signifying the essence is only proposed after a subsequent process of refinement.

Second, by construing the agent intellect as a natural active principle of immaterial being, APM_3 circumvents the criteriological problem: namely, how does the agent intellect know to strip away or ignore "grey" but not "able to neigh" from the phantasm of Marengo, so as to produce universal "horse"? APM_3 can dismiss this problem altogether, since on this account, the agent intellect is not a sorting mechanism. Rather, given the right psychological conditions, the agent intellect naturally acts to reproduce the phantasm's likeness—whatever that may be—in an intelligible mode of existing in the intellect. This is a natural process, not a deliberate one. A natural agent does not *know* how to transmit its actualizing form—it simply *does so* in the presence of an appropriate receiver. (Similarly, one does not ask how fire "knows" to heat water until the temperature reaches 212 degrees Fahrenheit, or how human parents "know" how to produce a child with human rather than elephant characteristics.)

Third, APM_3 lessens the force of the interaction problem—namely, if the unaided material phantasm cannot affect the immaterial possible intellect, how can the immaterial agent intellect affect the material phantasm so as to abstract the species from it?—by reducing it to more fundamental questions about the nature

[108]For 'abstractum' as an ontological term meaning "existing immaterially," see Aquinas's use of the term with respect to Platonic forms, incorporeal substances, and the human soul (e.g. *In Physic.* 2.3.5 [Leon. 2.69, no. 4]; *De spirit. creat.* 4 ad 16 [Leon. 24/2.55:366–67]; 5 [60:147–49]; 8 [80:93–94]). See also Cromp, "L'abstraction de l'intellect agent," 4:192. And interestingly, there is strong historical precedent for this sort of non-literal usage, again from the Islamic philosophical tradition. See for instance Averroes, *Long Commentary* 3.5 [Crawford 401:408–10]: "The agent intellect is extracting these intentions out of potency into act [*extrahens has intentiones de potentia in actum*]"; and 3.18 [439:76–77]: "To abstract is nothing other than to make the imagined intentions actually understood [*intellectas in actu*], after they were in potency." Similarly, Avicenna uses language suggestive of unwrapping, saying that physical light "falls upon bodies, and whiteness or blackness or greenness is uncovered [*detegitur*] in them" (*Liber de anima* 3.1 [Van Riet, 1.171]), even though we know from his endorsement of APM_1 that light does not take anything away from bodies, but rather adds the form of visibility to them. Avicenna's peculiar use of the language of abstraction in connection with intellectual cognition has also caused his readers considerable grief; see n. 107 above.

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of causality. The interaction problem appears most pressing when abstraction is modeled on some sort of physical manipulation, as when the agent intellect is imagined to be rifling through the phantasm's content and extracting selected portions of it. Under APM_3, however, the agent intellect affects the phantasm not by *physical contact*, but through a mechanism that one could call *power-borrowing*: that is, the phantasm acquires from the agent intellect a causal power to act in a certain way. For Aquinas, the difference between causality by physical contact and causality by power-borrowing is the solution to this and other interaction problems.[109] In his view, the interaction problem only runs in one direction. Bodies exercise causality through physical contact—which is why the unaided phantasm cannot affect the immaterial intellect. But an immaterial entity can exercise causality on a physical entity (or on a less-powerful immaterial entity) by lending its causal power to the lower entity. For Aquinas, this is also why God is able to act in and through the world of creatures: What is immaterial is "more formal" and "has a more universal power."[110] Such a view would seem to require a theory such that a form can borrow another form's power directly without the power needing to be instantiated in the recipient's matter, enabling forms dependent on matter to borrow powers from forms independent from matter, assuming the borrowing forms are properly disposed. The phantasms are presumably by their nature properly disposed to carry the power of the agent intellect, or else the human intellect could not have essences of material things as its proper objects (in other words, the sphere of the agent intellect's immaterializing action is precisely that of the phantasms).[111]

This solution is certainly not very satisfying; indeed, a much more in-depth examination of Aquinas's theory of causality would be required in order to determine whether it can be exonerated from charges of question-begging. Nevertheless, it at least shows that under APM_3, worries about interaction would have to be restructured as objections to Aquinas's entire system of primary and secondary causality, as well as to the possibility of exercising causality outside the framework of physical contact.

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[109]In fact when an objector raises the interaction problem in *De malo* 16.12, arg. 2, this is exactly Aquinas's answer: *[V]is ymaginatiua quodammodo mouet intellectum possibilem, non quidem uirtute sua set uirtute intellectus agentis . . . unde sicut lumen data coloribus quandam uirtutem instrumentalem faciendi immutationem spiritualem in sensu, ita et fantasmata in quantum instrumentaliter agunt in uirtute intellectus agentis, faciunt intellectum possibilem in actu intelligibilium specierum* (ad 2 [Leon. 43/1.334:221–31]).

[110]See for instance *Sum. theol.* Ia-IIae.9.5 [Leon. 6.80]: *Manifestum est autem quod nullum corpus agere potest in rem incorpoream, sed potius e converso: eo quod res incorporeae et immateriales sunt formalioris est universalioris virtutis quam quaecumque res corporeales* (cf. *De veritate* 18.8, ad 3 [Leon.22/2.559:118–28], where Aquinas takes care to note that the possible intellect is only affected by the ontologically inferior phantasms because of the primary agency of the ontologically superior agent intellect); and *De potentia* 3.7, ad 7 [Marietti, 59], explaining that an active power can temporarily inhere "intentionally" (i.e. without giving its subject the relevant form) in an instrument under the influence of an agent, *per modum quo colores sunt in aere, et virtus artis in instrumento artificis.*

[111]*In Ethic.* 6.2 [Leon. 47/2.338:234–36]: *[N]ecesse est enim quod potestati cuiuslibet causae subsit omne illud quod potest contineri sub proprio obiecto virtutis eius, sicut ignis potest calefacere omne calefactibile*; *De veritate* 8.4, ad 4 [Leon. 22/2.232:296–300]: *[A]nima secundum potentiam naturalem non se extendit ad plura intelligibilia quam ad ea quae possunt manifestari per lumen intellectus agentis quae sunt formae abstractae a sensibilibus.*

Yet although APM_3 escapes the standard objections to abstractionism, it faces its own set of challenges. For instance, one might argue that APM_3 is not empiricist enough, because the intellectual light adds something to the intellect that was not "first in the senses," that is, the form of intelligibility. Indeed, Aquinas agrees that "the senses are not the total cause of intellectual cognition."[112] Nevertheless, this does not seem to be of major concern, since in APM_3 the intellectual light does not add any *content*, but only a *new mode of existing*, that of intelligible being.[113]

A more serious worry is that APM_3 escapes the three standard objections only because it ultimately avoids the problem with which defenders of empiricism are normally concerned. As we have seen, since the intellectual light does not deliver well-defined concepts, Aquinas must reintroduce a process of sorting and separating at a later stage. So does he not just shunt the real problem of abstraction off to a later stage of cognition? That depends on where one locates the real problem of abstraction. In what we have seen of Aquinas's abstraction theory, the "problem of abstraction" actually breaks down into three distinct questions that are easily confused with one another: (a) The metaphysical question of how an extramental object is able to act on the intellect; (b) The psychological question of how concepts that represent *universally* (i.e. without restriction to any given particular) can be acquired from experience of particulars; (c) The epistemological question of how we are able to ascertain correctly what is *essential* to a certain kind of being without being misled by the accidental.

Whereas Aquinas's readers have commonly assumed that the agent intellect is supposed to be the answer to all three questions, it should be clear by this point that it is specifically intended to answer only the first two. It is the second of these—concerning our acquisition of concepts that represent universally rather than being restricted to one particular—that is central to debates about empiricism.[114] In this respect, APM_3 thus directly addresses contemporary concerns about the universality of abstracted concepts.

But what about the third question: if the activity of the agent intellect does not distinguish the essential from the accidental, what does? Here Aquinas relies, not on a preconceptual *mechanism* that would guarantee recognition of the essential, but on a later, messy, fallible *process* of refining the concepts we have already acquired through the activity of the agent intellect. A detailed exposition and analysis of this "other half" of Aquinas's account of abstraction falls outside the purview of this article, which is concerned merely with the role of the agent intellect. Nevertheless, we have already seen some of the central factors in this process in §4 above, in discussing the intellect's distinction-drawing operations (the $abstractions_o$ of *Sup.*

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[112]See *Sum. theol.* Ia.84.6, especially ad 3 [Leon. 5.324]: *Sensitiva cognitio non est tota causa intellectualis cognitionis. Et ideo non est mirum si intellectualis cognitio ultra sensitivam se extendit.*

[113]At least, it does not add new content relevant for understanding the essence of the extramental object. As I have argued, Aquinas holds that all actually intelligible being is self-intelligible, so because the agent intellect grants actually intelligible being *to the possible intellect* through the intelligible species, there is a sense in which the very intelligibility of the intelligible species is a kind of content that allows the intellect to cognize itself when it is cognizing anything else (*Aquinas on Human Self-Knowledge*, ch. 6).

[114]And in fact is one of the key points inspiring Geach's critique of abstractionism; see n. 74 above.

Boet. De Trin. 5.3) and the cooperative endeavor of imagination and intellect in acquiring experience and recognizing patterns of commonality (see *In Poster.* 2.20). Without going into too much detail, I would like to note briefly why I think this process of concept-refinement, too, has a good chance of evading the standard objections to abstraction theories mentioned above.

These standard objections acquire their force from two expectations: first, they expect prospective accounts of abstraction to explain how essences can be *inerrantly* distinguished from accidents; and second, they expect such accounts to explain how one picks out "essential features" from a data set composed of "essential" and "non-essential" features given in sensation. Aquinas, however, has no such expectations. Let us take for example a child who has just acquired the species "human" from the phantasm of her mother. Per APM_3, as we know, the child's intelligible species "human" will reflect her sensory experience: for example, "the kind of being that smiles, has a certain shape and color, responds to crying, has a certain voice-quality," and so forth. But (contrary to the second expectation above) *all of these descriptors are accidental.* There is no "rational animal" in the mix of sensed descriptors—only observed characteristics and behaviors that *express* a rational and animal nature, and that any given human may or may not exhibit at any given time.[115] Thus before she can attain the essential definition "rational animal," the child will need to acquire enough experience to begin to recognize patterns of emerging commonality and distinctiveness (e.g. laughing, speaking, reasoning, creating, displaying a certain bodily structure, etc.). Ultimately, she will have to reason from these patterns of privileged descriptors to their cause, that is, by concluding that *being a rational animal is what unifies and makes sense of these patterns.* It is in this way that she can perform the $abstraction_o$ of the whole, "rational animal," from its parts.

Because of its dependence on reasoning and experience, then, this process of distinguishing the essential from the inessential is not guaranteed to be successful (contrary to the first expectation above). This may seem to contradict Aquinas's well-known insistence in *Sum. theol.* Ia.85.6 that the intellect "is not deceived [*fallitur*] concerning quiddities." But the latter does not mean that I am guaranteed the proper definition of "horse" when I want it; immunity from error does not imply immunity from ignorance. Moreover, this immunity from error concerning quiddities turns out to be rather weak. Aquinas merely means that as long as the concept "brave, battle-hardened animal" is internally coherent, there is neither truth nor falsity in my merely *thinking* it without predicating it of, say, a turtle, or Marengo. In the same text, he goes on to say that the intellect can err either in assigning a definition to the wrong entity, "as when the definition of a circle is applied to a triangle," or "when the definition is false in itself, implying the composition of impossibles, as if we take 'winged rational animal' as the

[115]This is especially well expressed in *Sent.* I.25.1.1, ad 2 [Mandonnet 1.602] and ad 8 [605–6]. Note, too, that the behaviors in question must express the nature in order to be useful in reasoning; the child could not reason to the definition "rational animal" if she only had experience of cryogenically frozen humans.

definition of some thing."[116] But normally we do not dream up definitions in a contextless void, but only because we are *seeking to understand something*, for example, a particular entity like Marengo, or more generally what differentiates the kind of entity we name "horse" from other entities. So in general, I do not merely entertain the definition 'brave, battle-hardened animal,' but propose it *as being the definition of a horse*—and this assertion is liable to truth or falsity.

To my mind, it is a strength of APM_3 that it does not aim to replace fully the explanatory "work" done by the X-Ray or Unwrapper Models on its own, but requires the introduction of an additional, fallible process of reasoning to explain how we distinguish the essential from the accidental. One of the major problems with the standard models is that they expect too much for too little explanatory investment. It is hard to see how such perfect knowledge of essences could arise so unerringly from changing sensory experiences, merely by the intervention of a single cognitive mechanism. Ultimately, this two-part account of abstraction allows for a more realistic appraisal of the limitations of human knowing, accommodating the possibility of development of conceptual content, the possibility of errors in applying concepts, and the possibility that different people with different experiences will understand the same kind of entity differently. If my experience of horses is limited to Marengo, then I will have a vague, descriptive, and ultimately deficient understanding of "horse" as the kind of thing that is small, grey, and fearless in battle, with four hooves and a mane. I might not be able to apply the concept correctly when I encounter similar beasts of a different species (e.g. a small cow or a donkey). And my understanding of "horse" will be different from that of someone who works on a horse farm, which will be different again from that of a veterinarian or zoologist. I can certainly improve my knowledge of horses through experience, instruction, and reason. But even then, my improvement will be constrained by the scope of my experience, my teachers' pedagogical expertise, and my facility in constructing valid arguments. Such an account seems to cohere with ordinary experience. It is also more thoroughly empiricist in the degree to which it allows sensory experience to shape intellectual cognition.

At the same time, we should not underrate Aquinas's optimism about our ability to gain genuine insight into the essences of things. The intentional object about which we are thinking, for Aquinas, is to be distinguished from the content of our understanding, that is, the aspect under which we are understanding that object. He is thus confident that although the horse farmer, the veterinarian, and I all understand "horse" differently, we are still all thinking about the same intentional object, the essence "horse." And he does not seem to be worried that our conceptual content might be wildly divergent from extramental reality (apart from exceptional cases such as hallucination).

This confidence has nothing to do with abstraction, however, and everything to do with his metaphysics. Further investigation on this topic needs to be directed, then, not toward the agent intellect, but toward the following premises: (1) Our acts of cognition are caused by horses that do in fact share a common nature. (2)

[116] See *Sum. theol.* Ia.85.6 [Leon. 5.343]; *In Metaph.* 9.11 [Marietti 456–57, nos. 1895–1909].

This nature is manifested by, rather than concealed by, the sensible accidents of horses, such that the accidental descriptors in the phantasm do somehow express the individuated reality of being-a-horse, allowing the resulting intelligible species to ground future reasoning to a definition of "horseness."[117] (3) The causal relationship between my intelligible species and Marengo is not just one of *efficient causality*, but the efficient causation of a *likeness*: as an active sensible, Marengo causes a sensory impression that is *like* him, which causes a phantasm that is *like* him, which causes an intelligible species that is *like* him. The assumption that the effect bears the likeness of the cause traces back again to Aquinas's metaphysical maxim, "Every agent makes things like itself." This maxim may be more important to his cognition theory than we realize.[118]

In conclusion, I believe that it is time to let Aquinas's abstractive mechanism out of the black box. This paper has shown that the language of "intellectual light" sets up APM_3 as the causal model for abstraction, according to which the agent intellect is a form of intelligibility that causes intelligibility in other things, analogous to physical light as the form of visibility that causes visibility in other things (as understood by Avicenna). There is, moreover, no point in asking why the agent intellect performs this intelligibilizing function. As Scotus famously quipped, it is ridiculous to ask why an irreducible active power does what it does; we cannot ask why heat heats or why the will wills, because the only answer can be to repeat, "because it is heat" or "because it is the will."[119] One might say the same thing about Aquinas's agent intellect: it immaterializes or intellectualizes, because *that is what this kind of active power does*. Of course, this line of reasoning may not be very satisfying. Nevertheless, all explanations must eventually reach a point of irreducibility, and it is, I think, helpful to realize that Aquinas's refusal to analyze the abstractive activity further is grounded in a metaphysical claim about the type of principle that it is, not in some special obscurity of its activity. The activity of the agent intellect is no less, and no more, mysterious than that of any other irreducible active power. In arguing for the existence of an agent intellect, Aquinas is making the case that in addition to irreducible natural active powers such as heating or willing, there is an irreducible natural active power of immaterialization in the universe as we know it, which enables us to grasp the objects of sensation in an unrestricted way as belonging to a kind—and that is the intellectual light of each human mind.

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[117]I take it that this is what Aquinas means in *In Poster.* 2.20 [Leon. 1*/2.246:258–71]: *Manifestum est enim quod singulare sentitur, proprie et per se, set tamen sensus est quodam modo etiam ipsius uniuersalis: cognoscit enim Calliam non solum in quantum est Callias, set etiam in quantum est hic homo, et similiter Sortem in quantum est hic homo. Et exinde est quod, tali acceptione sensus praeexistente, anima intellectiua potest considerare hominem in utroque. Si autem ita esset quod sensus apprehenderet solum id quod est particularitatis et nullo modo cum hoc apprehenderet uniuersalem naturam in particulari, non esset possibile quod ex apprehensione sensus causaretur in nobis cognitio uniuersalis*; see Smit, "Aquinas's Abstractionism," 95. See also De Libera, *Archéologie du sujet* 1:50–51, for the claim that thirteenth-century thinkers were developing a view of accidents as determinations of a substance, rather than quasi-entities inhering in a substance as in a container.

[118]For further analysis of the role of this kind of causation—which I call *agit sibi simile* causation—in abstraction, see Cory, "Averroes and Aquinas on the Agent Intellect's Causation of Intelligibles," 37–46.

[119]Scotus, *Quaest. Metaph.* 9.15 [Wolter, 372].

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De malo = Quaestiones disputatae de malo. [vol. 23, ed. P.-M. Gils, 1982]
De spirit. creat. = Quaestio disputata de spiritualibus creaturis. [vol. 24/2, ed. J. Cos, 2000]
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In De Sensu = Sentencia libri De sensu et sensato. [vol. 45/2, ed. R.-A. Gauthier, 1985]
In Ethic. = Sententia libri Ethicorum. [vol. 47/1–2, ed. R.-A. Gauthier, 1969]
In Meteor. = Expositio in libros Meteorologicorum. [vol. 3, 1886]
In Peryerm. = Expositio in Peryermenias. [vol. 1*/1, ed. R.-A. Gauthier, 1989]
In Physic. = In VIII libros Physicorum. [vol. 2, 1884]
In Poster. = Expositio libri Posteriorum. [vol. 1*/2, ed. R.-A. Gauthier, 1989]
Quaest. disp. de an. = Quaestiones disputatae de anima. [vol. 24/1, ed. B. C. Bazán, 1996]
Quodl. = Quaestiones de quolibet. [vol. 25, ed. R.-A. Gauthier, 1996]
Sum. contra. gent. = Summa contra gentiles. [vols. 13–15, 1918–30]
Sum. theol. = Summa theologiae. [vols. 4–12, 1886–1906]
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